City of Edgewater
Whistle Stop Park Improvements
Technical Specifications
Prepared by Dredging & Marine Consultants, LLC

Item 1 **Mobilization and Demobilization:**

The work specified in this section consists of the preparatory work and operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site, and for the establishment of temporary offices, buildings, safety equipment and first aid supplies, sanitary and other facilities, as required by these Technical Specifications, the special provisions, and State and local laws and regulations. This item also includes costs associated with removal of equipment, supplies, temporary offices and other materials once construction is complete.

All costs for the necessary bonds as indicated in the bid document shall be included in this item.

All costs for permits and any required insurance, temporary traffic control (TTC), and any other pre-construction expense necessary for the start of the work, as well the cost of the removal of the above items, shall also be included in this item.

At the pre-construction meeting, the CONTRACTOR shall submit a tentative work schedule, TTC plan, and safety plan as well as contact info for staff, SUB-CONTRACTOR staff, and emergency contacts.

70% of this lump sum cost shall be paid upon mobilization of equipment to the project site. The balance of this cost shall be paid upon removal of all equipment from the project site.

The basis of payment for **Mobilization/ Demobilization** shall be LUMP SUM.

Item 2 **Construction Survey and As-Built Survey:**

The bid price for this item shall include all necessary survey work for the CONTRACTOR to complete all construction activities. Elevations for the plans are based on the NGVD 1988 datum.

The CONTRACTOR shall furnish the services of a State of Florida licensed land surveyor for the field layout of all work. The CONTRACTOR's licensed land surveyor shall perform all initial site layout and shall provide follow-up verification of all work underway at a frequency of no less than once a week. The ENGINEER must approve the initial site stakeout before any work begins.

In addition, the bid price for this item shall include all necessary survey work for the CONTRACTOR to prepare five (5) hard copies and three (3) electronic copies of the completed project. These documents shall be signed and sealed by a professional surveyor registered in the State of Florida and then submitted to the ENGINEER for approval. The CONTRACTOR shall accurately record the location and elevations of all constructed grades and structures including but not limited to, all features, trailway, new sport facilities, new restroom building, stormwater ponds, stormwater pond control structures (designated as CS-1, CS-2, CS-3 and CS-4 in the plans; data to be collected for these structures includes elevations and dimensions of all weirs, orifices, structure bottoms, grates, pipe connections and

skimmer structures), splash park, playground, stormwater pipe inverts, utilities, water elevations, ROW lines and easement lines.

The basis of payment for **Construction Survey & As-Built Survey** shall be LUMP SUM.

Item 3 **Environmental Compliance:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment and materials needed to maintain regulatory compliance during all phases of construction. Silt fencing and other required turbidity control measures shall be installed around construction areas at all times and the CONTRACTOR shall take all proactive measures to reduce loss of sediment and turbidity during all construction activities. The CONTRACTOR shall inspect all installed erosion and sediment control measures on a weekly basis, and shall immediately repair or replace any measures which have been damaged or displaced. In addition, the CONTRACTOR shall comply with all permits for this project and all federal, state, and local water quality standards throughout the duration of the project. The SJRWMD permit has been provided as *Attachment 1- Whistle Stop Park SJRWMD Environmental Resource Permit.*

CONTRACTOR shall take all necessary precautions to avoid damage to wetland vegetation or trees to be preserved.

This item also includes any costs related to obtaining the NPDES permit and complying with all NPDES permit requirements.

50% of this lump sum shall be paid upon obtaining an NPDES permit and deploying erosion and turbidity control measures. The balance will be paid as the project progresses.

The basis of payment for **Environmental Compliance** shall be LUMP SUM.

Item 4 **Clearing, Grubbing and Hauling:**

The bid price for this item shall include, but not be limited to, the required manpower, equipment, material, and other costs involved in clearing the project area for the proposed construction as indicated in the construction plans. The work shall include the complete removal and legal disposal of all sod, trees, brush, rubbish, vegetation, roots, debris, borrow material and any other remaining obstructions within the project limits. Absolutely no burying of brush or other removed materials within the project boundaries is permitted.

CONTRACTOR shall take all necessary precautions to avoid damage to wetland vegetation or trees to be preserved.

CONTRACTOR shall take all necessary precautions to avoid damage to existing utilities and structures that are to remain. Any damage to utilities or existing structures shall be repaired at the CONTRACTOR's expense.

The basis of payment for **Clearing, Grubbing and Hauling** shall be LUMP SUM.

Item 5 **Demolition and Hauling:**

The bid price for this item shall include, but not be limited to the required manpower, equipment, material and other costs involved in demolition and hauling

as indicated in the construction drawings.

CONTRACTOR shall take all necessary precautions to avoid damage to wetland vegetation or trees to be preserved during removal, demolition and hauling of debris.

Typical asbestos/ hazardous materials protocol must be completed before demolition of buildings or other structures is undertaken.

The basis of payment for **Demolition and Hauling** shall be LUMP SUM.

Item 6 **Grading and Compaction:**

The bid price for this item shall include, but not be limited to the required manpower, equipment, materials, and any other items necessary, including any possible dewatering techniques, and all applicable safety measures, for excavation, grading and compaction as indicated on the plans, technical reports, and specifications.

The ENGINEER shall make the determination of soil suitability upon request by the CONTRACTOR. Any fill placed by CONTRACTOR not acceptable to the ENGINEER shall be removed and replaced with suitable material at the CONTRACTOR'S expense.

The CONTRACTOR shall maintain all earthwork construction throughout the life of the contract, and shall take all reasonable precautions to prevent loss of material from the project site due to the action of wind or water. The CONTRACTOR shall repair at their expense, except otherwise provided herein, any slides, washouts, settlements, subsidence, vandalism, or other mishap, which may occur prior to final acceptance of the work.

Compaction and proof rolling must be completed in (1) one foot lifts and in compliance with the plans, CITY requirements and the geotechnical report provided as *Attachment 2- Whistle Stop Park Geotechnical Report*.

This item shall also include all compaction testing. Two compaction tests will be required per each installed lift for the new restroom, splash pad, playground, tennis courts, racquetball courts, and skate park. Compaction for the foundations for the Lifetrail Advanced Wellness System fitness stations shall be in accordance with the MANUFACTURER's requirements. In addition, one compaction test must be taken for every one hundred feet on each lift of the trailway foundation. All compaction for roadway/parking area paving, and bedding for underground utilities, shall be per CITY standards.

The basis of payment for **Grading and Compaction** shall be LUMP SUM.

Item 7 **Fill:**

The bid price for this item shall include, but not be limited to the required manpower, equipment and other costs involved in importing, placing and grading clean fill material as needed to achieve final grades as noted on the construction plans.

A gradation test and percent organics test must be submitted to the ENGINEER for approval before any fill is purchased or placed on the project site. This testing

must be performed for all sources of fill material. Any fill placed by the CONTRACTOR without the approval noted above shall be removed and replaced at no additional expense to the CITY. Fill must be completely free of debris, vegetation and organics. Fill shall consist of sandy soils meeting the requirements for classification as Type A-3 per AASHTO M 145.

The basis of payment for **Fill** shall be per CUBIC YARD.

Items 8 through 17 <u>Stormwater Inlets, Pipe and Other Structures:</u>

The bid price for these items shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to furnish, install and construct stormwater management system pipes, inlets and other structures as indicated in the plans.

Shop drawings of all structures and pipe must be submitted to the ENGINEER in writing for approval before any construction begins. Any products or materials purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding products or materials are not approved by the ENGINEER.

Inline drains (Nyloplast or approved equal) shall be installed in accordance with the Manufacturer's instructions and recommendations. Grates for inline drains must be compliant with the Americans with Disabilities Act (ADA). Shop drawings for inline drains and grates must be submitted to the ENGINEER for approval prior to purchasing or installing these items. Any inline drain or outlet pipe placed without this approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

PVC pipe shall conform to the requirements of ASTM D1785, for Type I, Grade 1, Schedule 80 PVC pipe with a minimum polymer cell classification of 12454 per ASTM D1784 and a minimum of 1.5% by weight of titanium dioxide for UV protection.

Furnish and install rubble riprap at stormwater outlet structures to ponds and receiving wetland areas as detailed in the plans. All materials, placement and installation methods shall be in accordance with the specifications for *Rubble Riprap, Ditch Lining* within Section 530 of the *FDOT Standard Specifications for Road and Bridge Construction* (Latest Edition), and all other sections referenced therein. The CONTRACTOR will submit shop drawings and technical data sheets for rubble and Type D-2 filter fabric to the ENGINEER for approval prior to ordering or placing these items. Any riprap placed without this approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

Final acceptance of stormwater pond control structures (designated as CS-1, CS-2, CS-3 and CS-4 in the plans) will not be issued until the ENGINEER reviews the as-built survey data and determines that elevations and dimensions of all weirs, orifices, structure tops and bottoms, skimmers and pipe connections have been constructed as per the plans, within acceptable tolerances (for elevations, acceptable tolerance is defined as within +/- 0.05 feet of design elevation; for dimensions acceptable tolerance is defined as within +/- 5 % of design lengths, widths, and/or diameters).

The CONTRACTOR shall be required to make field adjustments to any elevation or dimension that falls outside these acceptable tolerance ranges, and then resubmit survey data to prove that the adjusted item(s) are within acceptable tolerance limits. This work, if necessary, shall be performed by the CONTRACTOR without additional compensation.

SECTION 425
INLETS, MANHOLES, AND JUNCTION BOXES

425-1 Description.
Construct inlets, manholes, and junction boxes from reinforced concrete as shown in the Design Standards and the Plans. Furnish and install the necessary metal frames and gratings. Adjust structures shown in the Plans to be adjusted or requiring adjustment for the satisfactory completion of the work.
For precast structures, meet the requirements in 449-1 (below).

425-2 Composition and Proportioning.

425-2.1 Concrete: For inlets, manholes, and junction boxes, use Class II or IV concrete, as designated in the Plans and Design Standards and as specified in Section 346 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)).

425-2.2 Mortar: For brick masonry, make the mortar by mixing one part Portland cement to three parts sand. Miami Oolitic rock screenings may be substituted for the sand, provided the screenings meet the requirements of 902-5.2.3 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)) except for gradation requirements. Use materials passing the No. 8 sieve that are uniformly graded from coarse to fine.
Masonry cement may be used in lieu of the above-specified mortar provided it is delivered in packages properly identified by brand name of manufacturer, net weight of package, and whether it is Type 1 or Type 2, and further provided that it has not been in storage for a period greater than six months.

425-3 Materials.

425-3.1 General: Meet the following requirements:
Sand (for mortar) 902
Portland Cement.....Section 921
Water .....Section 923
Reinforcing Steel ..... 931 and 415
Liner Repair Systems .....Section 948
Brick and Concrete Masonry Units .....Section 949
Castings for Frames and Gratings 962

425-3.2 Gratings, Covers, and Frames: Use gratings and frames fabricated from structural steel or cast iron as designated in the appropriate Design Standard. When “Alt. G” grates are specified in the Plans, provide structural steel grates that are galvanized in accordance with the requirements of ASTM A123.
Use rigid frames and covers either 24 inches or 36 inches or optional three-piece adjustable frames and covers as indicated in FDOT Design Standards, Index No. 201. For three-piece adjustable frames, the inner frame may include replaceable resilient seats to support the cover. In addition, the inner frame shall indicate it is adjustable, by

clearly having the word “adjustable” imprinted into the exposed portion of the inner frame so ”adjustable” is visible from the roadway after installation.

425-4 Forms.
Design and construct wood or metal forms so that they may be removed without damaging the concrete. Build forms true to line and grade and brace them in a substantial and unyielding manner. Obtain the Engineer’s approval before filling them with concrete.

425-5 Precast Inlets, Manholes, and Junction Boxes.
Precast inlets, manholes, and junction boxes, designed and fabricated in accordance with the Plans, the FDOT Design Standards and Section 449 (below) may be substituted for cast-in-place units.

425-6 Construction Methods.

425-6.1 Excavation: Excavate as specified in Item #6. Where unsuitable material for foundations is encountered, excavate the unsuitable material and backfill with suitable material prior to constructing or setting inlets, manholes and junction boxes.
As an option to the above and with the Engineer’s approval, the CONTRACTOR may carry the walls down to a depth required for a satisfactory foundation, backfill to 8 inches below the flowline with clean sand and cast a non-reinforced 8 inch floor.

425-6.2 Placing and Curing Concrete: Place the concrete in the forms, to the depth shown in the Plans, and thoroughly vibrate it. After the concrete has hardened sufficiently, cover it with suitable material and keep it moist for a period of three days. Finish the traffic surface in accordance with 522-7.2, or with a simulated broom finish approved by the Engineer.

425-6.3 Setting Manhole Castings: After curing the concrete as specified above, set the frame of the casting in a full mortar bed composed of one part portland cement to two parts of fine aggregate.

425-6.3.1 Standard Castings: Set manhole frames in a mortar bed and adjust to grade using brick or concrete grade rings, with a maximum 12 inch adjustment.

425-6.3.2 Optional Adjustable Castings: When using a three-piece adjustable frame and cover, install the frame and cover with brick or concrete grade rings to the base course height. Make adjustments using the inner frame in accordance with the manufacturer’s installation recommendations so the inner frame and cover meet the grade and slope of the pavement surface opened to traffic.

425-6.4 Reinforcing Steel: Follow the construction methods for the steel reinforcement as specified in Section 415 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition).

425-6.5 Laying Brick: Brick masonry may be used if the structure is circular and constructed in place, or for adjustments of rectangular risers up to a maximum 12 inches in height. Saturate all brick with water before laying. Bond the brick thoroughly into the mortar using the shove-joint method to lay the brick. Arrange headers and stretchers so as to bond the mass thoroughly. Finish the joints properly as the work progresses and ensure that they are not less than 1/4 inch or more than 3/4 inch in thickness. Do not use

spalls or bats except for shaping around irregular openings or when unavoidable at corners.

425-6.6 Backfilling: Backfill as specified in Section 125 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition), meeting the specific requirements for backfilling and compaction around inlets, manholes, and junction boxes detailed in 125-8.1 and 125-8.2 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition). However; for outfall lines beyond the sidewalk or future sidewalk area, where no vehicular traffic will pass over the pipe, inlets, manholes, and junction boxes, compact backfill as required in 125-9.2.2 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition).

425-6.7 Adjusting Structures: Cut down or extend existing manholes, catch basins, inlets, valve boxes, etc., within the limits of the proposed work, to meet the finished grade of the proposed pavement, or if outside of the proposed pavement area, to the finished grade designated in the Plans for such structures. Use materials and construction methods which meet the requirements specified above to cut down or extend the existing structures.
The CONTRACTOR may extend manholes needing to be raised using adjustable extension rings of the type which do not require the removal of the existing manhole frame. Use an extension device that provides positive locking action and permits adjustment in height as well as diameter and meets the approval of the Engineer. When adjusting structures in flexible pavement, restore final road surface in accordance with the FDOT Design Standards, Index No. 307.

425-7 Method of Measurement.
The quantities to be paid for will be (1) the number of inlets, manholes, junction boxes, and yard drains, completed and accepted; and (2) the number of structures of these types (including also valve boxes) satisfactorily adjusted.

SECTION 449

PRECAST CONCRETE DRAINAGE PRODUCTS

449-1 Description.
Precast concrete drainage products hereinafter called products, may include but are not limited to, round concrete pipe, elliptical concrete pipe, underdrains, manholes, endwalls, inlets, junction boxes, three-sided precast concrete culverts, and precast concrete box culverts.

Ensure that all precast drainage products are designed and manufactured in accordance with the requirements of the Contract Documents.

Obtain precast concrete pipes, box culverts, and drainage structures from a plant that is currently on the FDOT list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition).

At the beginning of each project, provide a notarized certification statement to the Engineer from a company designated representative certifying that the plant will manufacture the products in accordance with the requirements set forth in the Contract Documents and plant's Quality Control (QC) Plan. The Quality Control Manager's stamp on each product indicates certification that the product was fabricated in conformance

with the CONTRACTOR's QC Plan, the Contract, and this Section. Ensure that each shipment of precast concrete products to the project site is accompanied with a QC signed or stamped delivery ticket providing the description and the list of the products.

When the producer's Quality Control Program is suspended by FDOT, accept responsibility of either obtaining products from a plant with an approved Quality Control Program, or await re-approval of the plant. The Engineer will not allow changes in Contract time or completion dates as a result of the plant's loss of qualification. Accept responsibility for all delay costs or other costs associated with the loss of the plant's qualification.

449-2 Materials.
Ensure that the materials used for the construction of the precast drainage products have a certification statement from the source, showing that they meet the applicable requirements of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition) with the following modifications:

Reinforcing Bar .....Section 415
Coarse Aggregate* .....Section 901
Fine Aggregate* .....Section 902
Portland Cement and blended cement .....Section 921
Water .....Section 923
Admixtures .....Section 924
Pozzolans and slag .....Section 929
Gasket Material .....Section 942
Blended Hydraulic Cements .....AASHTO M 240
Welded Wire Reinforcement .....Section 931
Wire for Site Cage Machines .....Section 931
Liner Repair Systems .....Section 948

*For concrete pipes the gradation requirements of concrete aggregates as set forth in Sections 901 and 902 are not applicable.

449-3 Construction Requirements.
Unless otherwise stipulated within the Contract Documents, meet the following requirements for concrete mix, product design, fabrication, transportation, and installation, as detailed in FDOT Standard Specifications for Road and Bridge Construction (Latest Edition):

Pipe Culverts and Storm Sewers .....Section 430
Inlets, Manholes, and Junction Boxes .....Section 425 and ASTM C 478
Steel Reinforced Round Concrete Pipe .....ASTM C 76
Reinforced Elliptical Concrete Pipe .....ASTM C 507

Meet the special requirements for the applicable pipes as described in 449-4 and 449-5.

449-4 Concrete Pipe.

449-4.1 Special Requirements for Steel Reinforced Concrete Pipe: Use pipe meeting the requirements of ASTM C76 with the modifications as described in 449-4.2. Use Special Designed pipe meeting the requirements of ASTM C655. Use Class S pipe meeting the requirements of ASTM C655. Ensure all pipes are properly marked.

449-4.2 Modifications to ASTM C 76 and ASTM C 507: The following supersedes the provisions of ASTM C76 and ASTM C507:

(a) Ensure all materials used in concrete are certified from the source and conform to the requirements of 449-2.

(b) Ensure all Joint Reinforcement requirements are in accordance with the Design Standards.

(c) When membrane curing compounds are used, ensure that the requirements of 925-2 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)) are met and the membrane curing compounds are applied in accordance with 400-16 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)) immediately after the pipe has been removed from the form.

(d) Ensure the manufacturer has a suitable apparatus for testing each product in accordance with ASTM C497 and performs all tests outlined in ASTM C497 when requested by the Engineer.

(e) Ensure that the variation of laying lengths of two opposite sides of pipe is not more than 1.04% of the diameter, with a maximum of 1/2 inch in any length of pipe, except where beveled-end pipe for laying on curves is specified.

(f) Ensure that the type of wall markings is included on all precast pipes.

(g) Ensure all repairs are made in accordance with Section 449-5.4.

449-4.3 Special Requirements for Non-Reinforced Concrete Pipe: Ensure the requirements of ASTM C985 are met with the following exception: Modify material requirements set forth in ASTM C985 with the material requirements set forth in 449-2. Ensure all pipes are properly marked.

449-4.4 Special Requirements for Reinforced Elliptical Concrete Pipe: Use elliptical concrete pipes conforming to the requirements of ASTM C507, except for the exceptions and modifications as specified in 449-4.2. Ensure the requirements of Table I of ASTM C507 for standard elliptical pipe, the requirements of Class HE-III and Class HE-IV of Table I of ASTM C507 for standard elliptical pipe and special elliptical pipe, respectively are met and the joint design requirements set forth in Article 7 of ASTM C443 are met.

449-4.5 Concrete Underdrain Pipe

Section deleted – not applicable.

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449-4.6 Rejection of Concrete Pipe: Specific causes for rejection of concrete pipe, in addition to any failure to meet the general requirements specified in the Contract Documents, are as follows:

(a) Failure to meet the requirements listed in ASTM C76 for permissible variations in dimensions with the modifications outlined in 449-4.1 and 449-4.2.

(b) Occurrence of defects listed in ASTM C76.

449-5 Requirements For Pipe Joints When Rubber Gaskets Are To Be Used.

449-5.1 Design of Joint: Use pipe joint of the bell-and-spigot type or the double spigot and sleeve type, meeting the requirements called for in the Design Standards. Ensure the joint is so proportioned that the spigot, or spigots, will readily enter the bell or sleeve of the pipe.

Ensure the joint ring forms for forming the joint surface are made of either heavy steel, cast iron, or aluminum, and accurately machined to the dimensions of the joint. They must be a true circular form within a tolerance of 1/32 inch. Dimensional checks of joint ring form will indicate for each size pipe a length of spigot, or tongue, not more than 1/8 inch shorter than the bell, or groove, depth. The pipe will be so manufactured that joint surfaces are concentric with the inside of the pipe within a tolerance of 3/32 inch. The shape and dimensions of the joint must be such as to provide compliance with the following requirements:

(a) The joint must be so dimensioned that when the gasket is placed on the spigot it will not be stretched more than 20% of its original length, or the maximum stretch length that is recommended by the manufacturer, whichever is lower.
(b) The space provided for the gasket must be a groove in the spigot end of the pipe and such space, when the joint is made, it cannot be more than 110% of the volume of the gasket.
(c) The joint must be designed so that when the outer surface of the spigot and the inner surface of the bell come into contact at some point on the periphery, the diametric deformation in the gasket at the point of contact cannot be greater than 50% of the normal gasket diameter, and the diametric deformation in the gasket at a point opposite the contact point cannot be less than 20% of the normal gasket diameter.
(d) When the pipes are joined, there must be parallel surfaces on both the bell and the spigot, extending from the outside edge of the gasket toward the bell face for a distance of not less than 3/4 inch. These parallel surfaces cannot be farther apart than 1/8 inch, when the spigot is centered in the bell. The tapers on these surfaces cannot exceed three degrees.
(e) The inside surface of the bell at the end of the bell must be flared to facilitate joining the pipe sections without damaging or displacing the gasket.

449-5.2 When Rubber Gaskets are Used: Ensure that the pipe joints have been tested at the plant hydrostatically and shown to meet the requirements of Section 6.2 of the FDOT Materials Manual, which is available at the following URL:

http://www.dot.state.fl.us/programmanagement/Implemented/URLinSpecs/Section62V2.shtm

449-5.3 When Profile Rubber Gaskets are Used: Ensure the joint design meets the requirements set forth in Article 7 of ASTM C443.

449-5.4 Tolerances in Imperfections, and Permissible Repairs for Joint of Concrete

Gasketed Pipe: Ensure that all surfaces of near-contact of the jointed pipes are free from air holes, chipped or spalled concrete, laitance, and other such defects. Pipes showing minor manufacturing imperfections or handling injuries to the bell or spigot may be acceptable if such defects are acceptably repaired as prescribed below.
Individual air holes (trapped air), or spalled areas with a length of up to one-half the pipe radius, or 12 inches whichever is less, may be repaired by careful use of a hand-placed, stiff, pre-shrunk, 1-to-1 mortar of cement and fine sand, and with no additional preparation other than a thorough washing with water of the defect. Curing will be done either by moisture curing under wet burlap or by application of an approved membrane curing compound.

Such repaired pipe which is sound, properly finished and cured, and which otherwise conforms to specification requirements will be acceptable.

Exposed reinforcing and minor spalling in the spigot groove may be accepted if repaired in the following manner: The spalled areas will be chipped back to solid concrete. Exposed reinforcing will be cleaned of all laitance and scale. The entire area is to be coated with an approved epoxy at a thickness of 5 to 10 mils. The coating must be smooth and conform to the shape of the groove. The epoxy must be a Type F-1 as specified in Section 926 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition).

The basis of payment for Item 8 **(18" RCP)** shall be per LINEAR FOOT.
The basis of payment for Item 9 **(24" RCP)** shall be per LINEAR FOOT.
The basis of payment for Item 10 **(Mitered End Section)** shall be per EACH.
The basis of payment for Item 11 **(Type "C" Storm Inlet, Modified)** shall be per EACH.
The basis of payment for Item 12 **(Type "C" Storm Inlet)** shall be per EACH.
The basis of payment for Item 13 **(Curb Inlet Type 3)** shall be per EACH.
The basis of payment for Item 14 **(Curb Inlet Type 4)** shall be per EACH.
The basis of payment for Item 15 **(Inline Drain)** shall be per EACH.
The basis of payment for Item 16 **(15" PVC Pipe)** shall be per LINEAR FOOT.
The basis of payment for Item 17 **(Rubble Riprap, Ditch Lining)** shall be per TON.

Items 18, 19 & 20 <u>Concrete Trailways & Sidewalks:</u>

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to properly construct patterned concrete trailways and sidewalks throughout the project area as indicated in the construction plans. The individual items included in this specification refer to concrete walkways and sidewalks in 10 ft., 12 ft. and 5 ft. widths, respectively.

SECTION 522
CONCRETE SIDEWALK

522-1 Description.
Construct concrete sidewalks. Sidewalk will include sidewalk curb ramps.

522-2 Materials.
Meet the requirements specified in 520-2.

522-3 Forms.
Provide forms as specified in 520-3.

522-4 Foundation.
Compact fill areas, including cut areas under the sidewalk that have been excavated more than 6 inches below the bottom of sidewalk, to a minimum of 95% of AASHTO T99 density. The area to be compacted is defined as that area directly under the sidewalk and 1 foot beyond each side of the sidewalk when right-of-way allows.

522-5 Joints.

522-5.1 Expansion Joints: Form 1/2 inch expansion joints between the sidewalk and the curb or driveway or at fixed objects and sidewalk intersections with a preformed joint filler meeting the requirements specified in 932-1.1.

522-5.2 Contraction Joints:
522-5.2.1 Types: The CONTRACTOR may use open type or sawed contraction joints.

522-5.2.2 Open-Type Joints: Form open type contraction joints by staking a metal bulkhead in place and depositing the concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, remove the bulkhead. After finishing the sidewalk over the joint, edge the slot with a tool having a 1/2 inch radius.

522-5.2.3 Sawed Joints: If electing to saw the contraction joints, cut a slot approximately 3/16 inch wide and not less than 1-1/2 inches deep with a concrete saw after the concrete has set, and within the following periods of time:

Joints at not more than 30 feet intervals - within 12 hours after finishing.
Remaining joints - within 96 hours after finishing.

522-6 Placing Concrete.
Place the concrete as specified in 520-5.

522-7 Finishing.
522-7.1 Screeding: Strike-off the concrete by means of a wood or metal screed, used perpendicular to the forms, to obtain the required grade and remove surplus water and laitance.

522-7.2 Surface Requirements: Imprint concrete as detailed in the Plans, otherwise provide a broom finish. Ensure that the surface variations are not more than 1/4 inch under a 10 foot straightedge or more than 1/8 inch on a 5 foot transverse section. Finish the edge of the sidewalk with an edging tool having a radius of 1/2 inch.

522-8 Curing.
Cure the concrete as specified in 520-8.

522-9 Method of Measurement.
The quantity to be paid will be plan quantity, in linear feet, completed and accepted. Ramps, reconstructed sidewalks, walk around sidewalks, sidewalk landings, sidewalk curb, and driveways will be included in the area to be paid.

522-10 Basis of Payment.
Price and payment will be full compensation for all work specified in this Section. Excavation for new installations will be paid for under the items for the grading work on the project.

Shop drawings of the sidewalk and concrete mix must be submitted to the ENGINEER in writing for approval before any construction begins. All concrete mix tickets shall be copied and submitted to the ENGINEER. In addition, the CONTRACTOR is responsible for all concrete testing, testing must occur once each day for each mix poured on site.

Linear foot quantities do not account for grade changes; it is the CONTRACTOR's responsibility to account for changes in grade.

The basis of payment for Item #18, **Concrete Trailway & Sidewalk (10' Width)** shall be per LINEAR FOOT.
The basis of payment for Item #19, **Sidewalk at Farmers Market (12' Width)** shall be per LINEAR FOOT.
The basis of payment for Item #20, **Concrete Sidewalk (5' Width)** shall be per LINEAR FOOT.

Item 21 Coquina Concrete at Promenade & Flagpole:

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to properly construct patterned coquina concrete at the promenade area and at the flagpole as indicated in the construction plans.

The CONTRACTOR shall supply concrete meeting the requirements of Section 347 in **Item 22 Type "F" Curb** below. Prepare the bearing surface for the concrete slab in accordance with Section 4.3 (Site Preparation for Shallow Foundations) of the Geotechnical Report by Universal Engineering Sciences, Inc. (attached to these bidding documents). Bearing surface shall be treated for termites by a pesticide applicator licensed in the State of Florida prior to pouring concrete slab. A 15 mil thickness plastic vapor barrier shall be placed on bearing surface prior to placing formwork and concrete reinforcement. Concrete slab shall be 6" thickness, 3000 PSI mix, reinforced with 6 x 6 x 10/10 welded wire mesh fabric, placed at 3 inches height from bottom of slab. Maintain minimum of 3 inches concrete cover over edges of welded wire mesh fabric. Use only non-metallic spacers and chairs for positioning welded wire mesh fabric.

SPECIAL FINISHES – for Coquina Concrete sidewalks
Monolithic Exposed-Aggregate Finish: Expose coarse aggregate in pavement surfaces as follows:

1. Immediately after float finishing, spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.
2. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom.
4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

The CONTRACTOR shall place control joints at all locations where dissimilar concrete structures meet, and will place expansion joints at 5 ft. intervals in both directions. The CONTRACTOR shall pour, form and finish an initial 20' x 10' test section of concrete, to allow the ENGINEER and the CITY to evaluate the control and expansion joints as well as the texture and appearance of the exposed aggregate finish.

CONTRACTOR shall submit concrete mix design, compaction/moisture testing results, and shop drawings/cut sheets for vapor barrier and all reinforcing materials to the ENGINEER for approval prior to placing any materials or pouring any

concrete. Any items placed before approval shall be removed and replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for Item #21, **Coquina Concrete at Promenade & Flagpole** shall be per SQUARE FOOT.

Item 22 Type "F" Curb:

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to properly construct FDOT Type "F" throughout the project area as indicated in the construction plans and per CITY standards. Refer to the construction plans for CITY standards, testing and material specifications.

SECTION 347
PORTLAND CEMENT CONCRETE - CLASS NS

347-1 Description.

The requirements of this Section are applicable to concrete designated as Class NS hereinafter referred to as concrete. Use concrete composed of a mixture of portland cement, aggregates, and water, with or without chemical admixtures, slag, or pozzolanic materials.

Deliver concrete to placement site in a freshly mixed, unhardened state. Ensure the concrete is placed and cured in a manner to ensure that the strength and durability of the concrete is maintained.

347-2 Materials.

347-2.1 General: Certify that all materials used in concrete are from FDOT approved sources, and free from frozen or other detrimental matter.

Meet the following requirements of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition):

Portland Cement..... Section 921
Coarse Aggregate ..... Section 901
Fine Aggregate ..... Section 902
Water ..... Section 923
Chemical Admixtures ..... Section 924
Pozzolans and Slag ..... Section 929

347-2.2 Admixture Requirements: Chemical admixtures may be added at the dosage rates recommended by the manufacturer.

347-2.3 Substitution of Materials: Approved material sources may be substituted for similar materials indicated on the originally approved mix design. Use originally approved mix components and proportions, when unsatisfactory test results are obtained from the use of the substituted material(s).

347-2.4 Material Storage: Use a concrete production facility that meets the following requirements:

347-2.4.1 Cementitious Materials Storage: Provide a separate and clearly labeled weatherproof facility to store each brand or type of cementitious material

without mixing or contamination. Provide a suitable, safe and convenient means of collecting cementitious material samples at each storage facility.

347-2.4.2 Aggregate Storage: Provide suitable bins, stockpiles or silos to store and identify aggregates without mixing, segregating or contaminating different grades or types of materials. Identify FDOT approved pit number and aggregate type/gradation. Handle the aggregates in a manner to minimize segregation and meet the specification requirements when recovered from storage. Continuously and uniformly sprinkle coarse aggregate with water, for 24 hours preceding introduction into the concrete mix. Maintain stored aggregates in a well-drained condition to minimize free water content. Provide access for the Engineer to sample the aggregates from the recovery side of the storage facility.

347-3 Production, Mixing and Delivery.

347-3.1 Concrete Production Requirements: Deliver concrete from a production facility that is certified by the National Ready-Mixed Concrete Association (NRMCA) or approved by the FDOT District Five Materials Office. The District Materials Office may inspect the concrete production facility's to verify compliance with the Specifications. Produce concrete utilizing equipment that is in good operating condition and operated in a manner to ensure a consistent product. Within two hours prior to each day's batching, ensure that the concrete production facility determines the free moisture for the coarse and fine aggregates. On concrete placements expected to exceed three hours, perform an additional moisture test approximately half way through the batching operations and adjust batch proportions accordingly. Ensure that the calibration of the measuring devices of the concrete production facilities meets the requirements of Chapter 531 of the Florida Statutes. At least quarterly, ensure that all scales, meters and other weighing or measuring devices are checked for accuracy by a qualified representative of a scale company registered with the Bureau of Weights and Measures of the Florida Department of Agriculture. Have the accuracy of admixture measuring dispensers certified annually by the admixture supplier. When Volumetric Mixers are used, deliver concrete in accordance with the requirements of Volumetric Mixer Manufactures Bureau (VMMB) and ensure that the vehicle has a VMMB registered rating plate. Substitution of structural concrete in lieu of non-structural concrete may be used if approved by the Engineer. If structural concrete is used in lieu of non-structural concrete, obtain the concrete from a production facility meeting the requirements of Section 346 of the FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)
.
Acceptance is based on the requirements of Section 347 (this section).

347-3.2 Mixers: Ensure that mixers are capable of combining the components of concrete into a thoroughly mixed and uniform mass, free from balls or lumps of cementitious materials, and capable of discharging the concrete uniformly. Operate concrete mixers at speeds per the manufacturer's design. Do not exceed the manufacturer's rated capacity for the volume of mixed concrete in the mixer, mixing drum, or container.

347-3.3 Delivery: The maximum allowable mixing and agitation time of concrete is 120 minutes.

347-3.4 Small Quantities of Concrete: With approval of the Engineer, small quantities of concrete, less than 3 cubic yards placed in one day and less than 0.5 cubic yards placed in a single placement may be accepted using a pre-bagged mixture. The Engineer will verify that the pre-bagged mixture is prepared in accordance with the manufacturer's recommendations and will meet the requirements of this Specification.

347-4 Control of Quality.

347-4.1 Concrete Mix Design: Before producing any concrete, submit the proposed mix design to the Engineer. Also submit three compressive strength test results tested in accordance with ASTM C 39 demonstrating the mix meets the minimum 28 day compressive strength requirement. The test results must be within twelve months of the submittal of the mix design. Use only concrete mix designs having prior approval of the Engineer. Materials may be adjusted provided that the theoretical yield requirement of the approved mix design is met. Show all required original approved design mix data and batch adjustments and substituted material on the concrete delivery ticket. The Engineer may disqualify any concrete production facility for non-compliance with Specification requirements.

347-4.2 Sampling and Testing: The Engineer may sample and test the concrete at their discretion to verify its quality. The minimum 28-day compressive strength requirement for this concrete is 3,000 psi.

347-4.3 Records: Maintain the following records for review for at least three years after final acceptance of the project:

1. Approved concrete mix designs.
2. Materials source (delivery tickets, certifications, certified mill test reports).
3. A copy of the scale company or testing agency report showing the observed deviations from quantities checked during calibration of the scales and meters.
4. A copy of the documentation certifying the admixture weighing/measuring devices.
5. Recent NRMCA, VMMB or FDOT inspection records certifying the plant or truck can produce concrete and documentation showing that action has been taken to correct deficiencies noted during the inspections.

347-5 Certification and Acceptance.

347-5.1 General: Furnish a Delivery Ticket with each batch of concrete before unloading at the placement site. Record material quantities incorporated into the mix on the Delivery Ticket. Ensure that the Batcher responsible for producing the concrete, certifies that the batch was produced in accordance with Specification requirements, signs the Delivery Ticket. Sign the Delivery Ticket certifying that the concrete was batched, delivered and placed in accordance with these Specifications. Acceptance by the City will be by Certification on the Delivery Ticket, as described herein, by the Batcher and the CONTRACTOR. The Engineer will hold the CONTRACTOR responsible for rejecting loads of concrete that do not meet the minimum compressive strength requirements. Delineate and replace, at no cost to the City, all concrete that does not meet the 28-day compressive strength requirements or has any cracking greater than 1/4 inch in width or 1/4 inch in vertical displacement. Any spalling or flaking off of the surface layer that exposes the rough, pitted aggregate surface in excess of 10 square inches is to be removed and replaced in accordance with 347-5.2. Sidewalk, ditch pavement, slope

pavement, Traffic Separator, or curb and gutter having any intersecting cracks visible in the dry concrete (regardless of size) will be removed and replaced in accordance with 347-5.2. At the sole option of the City, the Engineer may accept concrete at a reduced pay when it is determined that the concrete will serve its intended function. If any uncontrolled cracks appear during the life of the Contract unacceptable to the Engineer, remove and replace the concrete in accordance with 347-5.2 at no expense to the City.

347-5.2 Remedial Action: Remedial action will be the removal and replacement of all concrete to the full depth and width. Sidewalk, Curb and Gutter, Ditch Pavement and Traffic Separator: Begin saw cutting 2 1/2 feet either side or above and below the crack or at the nearest joint, remove and replace the 5 foot section encompassing the crack. Slope Pavement: Saw cut each scored joint above and below the crack and replace the entire section between the saw cuts, ensuring the section removed and replaced encompasses the crack.

SECTION 520
CONCRETE GUTTER AND CURB ELEMENTS

520-1 Description.
Construct portland cement concrete curb. Curb will include concrete curb and gutter, valley gutter, special concrete gutter, curb for sidewalk curb ramps and driveways, and any other types of concrete curb not specified in other Sections.

520-2 Materials.

520-2.1 Concrete: Use concrete meeting the requirements of Section 347 (see **Item 22: Type "F" Curb**).

520-2.2 Reinforcement: For all steel reinforcement required by the Plans, meet the requirements of Section 415 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)).

520-2.3 Joint Materials: Meet the requirements of Section 932 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)).

520-3 Forms.

520-3.1 Form Materials: Construct forms for this work of either wood or metal. Provide forms that are straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. For all items constructed on a radius, use flexible forms.

520-3.2 Depth of Forms: Ensure that forms have a depth equal to the plan dimensions for the depth of concrete being deposited against them.

520-3.3 Machine Placement: The CONTRACTOR may place these items by machine methods with the approval of the Engineer provided that the CONTRACTOR consistently produces an acceptable finished product, true to line, grade, and cross section.

520-4 Excavation.

Excavate to the required depth, and compact the foundation material upon which these items are to be placed as specified in plans.

520-5 Placing Concrete.

Place the concrete in the forms, and tamp and spade it to prevent honeycombing, and until the top of the structure can be floated smooth and the edges rounded to the radius shown in the Plans.

520-6 Joints.

520-6.1 Contraction Joints: Except for machine placed items, the CONTRACTOR may form joints by using dummy joints (either formed or sawed) or by using sheet metal templates. If using sheet metal templates, ensure that they are of the dimensions, and are set to the lines, shown in the Plans. Hold templates firmly while placing the concrete. Leave templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Saw contraction joints, for machine placed items, unless the Engineer approves an alternate method. Saw the joints as soon as the concrete has hardened to the degree that excessive raveling will not occur and before uncontrolled shrinkage cracking begins. Space contraction joints at intervals of 10 feet except where closure requires a lesser interval, but do not allow any section to be less than 4 feet in length.

520-6.2 Expansion Joints: Construct expansion joints at all inlets, at all radius points,and at other locations indicated in the Plans. Locate them at intervals of 500 feet between other expansion joints or ends of a run. Ensure that the joint is 1/2 inch in width.

520-7 Finishing.

520-7.1 Repair of Minor Defects: Remove the forms within 24 hours after placing the concrete, and then fill minor defects with mortar composed of one part portland cement and two parts fine aggregate. The Engineer will not allow plastering on the face of the curb. Remove and replace any rejected curb, curb and gutter, or valley gutter without additional compensation.

520-7.2 Final Finish: Finish all exposed surfaces while the concrete is still green. In general, the Engineer will only require a brush finish. For any surface areas, however, which are too rough or where other surface defects make additional finishing necessary, the Engineer may require the CONTRACTOR to rub the curb to a smooth surface with a soft brick or wood block, using water liberally. Also, if necessary to provide a suitable surface, the Engineer may require the CONTRACTOR to rub further, using thin grout or mortar.

520-7.3 Imprinted Concrete: Install imprinted concrete as shown in the Plans.

520-8 Curing.

520-8.1 General: Continuously cure the concrete for a period of at least 72 hours. Commence curing after completely finishing and as soon as the concrete has hardened sufficiently to permit application of the curing material without

marring the surface. Immediately replace any curing material removed or damaged during the 72 hour period. After removing the forms, cure the surfaces exposed by placing a berm of moist earth against them or by any of the methods described below, for the remainder of the 72 hour curing period.

520-8.2 Wet Burlap Method: Place burlap, as specified in 925-1(FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)), over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches. Hold the burlap securely in place such that it will be in continuous contact with the concrete at all times, and do not allow any earth between the burlap surfaces at laps or between the burlap and the concrete. Saturate the burlap with water before placing it, and keep it thoroughly wet throughout the curing period.

520-8.3 Membrane Curing Compound Method: Apply clear membrane curing compound or white pigmented curing compound, as specified in 925-2 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)), by a hand sprayer meeting the requirements of 350-3.10 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)), in a single coat continuous film at a uniform coverage of at least one gallon per 200 square feet. Immediately recoat any cracks, checks, or other defects appearing in the coating. Thoroughly agitate the curing compound in the drum prior to application, and during application as necessary to prevent settlement of the pigment.

520-8.4 Polyethylene Sheeting Method: : Place polyethylene sheeting, as specified in 925-3 (FDOT Standard Specifications for Road and Bridge Construction (Latest Edition)), over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches. Hold the sheeting securely in place and in continuous contact with the concrete at all times.

520-9 Backfilling and Compaction.

After the concrete has set sufficiently, but not later than three days after pouring, refill the spaces in front and back of the curb to the required elevation with suitable material. Place and thoroughly compact the material in layers not thicker than 6 inches.

520-10 Surface Requirements.

Test the gutter section of curb and gutter with a 10 foot straightedge laid parallel to the centerline of the roadway and while the concrete is still plastic. Perform straight edging along the edge of the gutter adjacent to the pavement or along other lines on the gutter cross-section, as directed by the Engineer. Immediately correct irregularities in excess of 1/4 inch.

520-11 Method of Measurement.

For curb or curb and gutter, the quantity to be paid will be plan quantity, in feet, measured along the face of the completed and accepted curb or curb and gutter. Curb for sidewalk curb ramps or driveways will be paid at the contract unit price for the adjacent curb type. For valley gutter or shoulder gutter, the quantity to be paid will be plan quantity, in feet, measured along the gutter line of the completed and accepted valley gutter or shoulder gutter.

520-12 Basis of Payment.

520-12.1 Concrete Gutter, Curb Elements, and Traffic Separator: Price and payment will be full compensation for all work specified in this Section, including removal of existing curb (repair and replacement/relocation operations), reinforcement steel, joint materials and asphalt curb pad.

The CONTRACTOR will be responsible for testing the concrete each day of the pour.

The basis of payment for and **Type "F" Curb** shall be per LINEAR FOOT.

Item 23 **Asphalt Parking and Roadway:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to properly construct the new asphalt roadway and parking areas as indicated in the construction plans and per CITY standards. Refer to the construction plans for CITY standards, testing and material specifications.

The basis of payment for **Asphalt Parking and Roadway** shall be per SQUARE YARD.

Item 24 **Parking Stops:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other needed provisions to install parking stops as indicated in the construction plans, per City of Edgewater Standard Construction Detail M-6 (included in the construction plans).

The CONTRACTOR may choose to install pre-cast parking stops that are delivered to the site; if the CONTRACTOR chooses to use pre-cast stops, shop drawings must be submitted to the ENGINEER for approval prior to ordering. Any parking stops purchased or installed without the approval of the ENGINEER shall be replaced by the CONTRACTOR at no additional expense to the CITY.

The basis of payment for **Parking Stops** shall be per EACH.

Item 25 **Event Patio:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other needed provisions to install the concrete event patio as indicated in the construction plans. The bid price shall include all necessary compaction and compaction testing for the event patio subbase, as well as required concrete testing. The cost for electrical service and outlets for the event patio shall be included in the unit cost for **Item 58 (Lighting, Electrical Distribution, Service Connections).**

The CONTRACTOR shall provide an exposed aggregate finish concrete identical to the concrete specified in **Item 21 (Coquina Concrete at Promenade & Flagpole)** above. Subsurface preparation, reinforcement, slab thickness, concrete mix design, finishing, etc. shall all be in accordance with the specifications and

requirements for **Item 21.** A separate test section will not be required.

CONTRACTOR shall submit concrete mix design, compaction/moisture testing results, and shop drawings/cut sheets for vapor barrier and all reinforcing materials to the ENGINEER for approval prior to placing any materials or pouring any concrete. Any items placed before approval shall be removed and replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Event Patio** shall be per SQUARE FOOT.

Item 26 **Signage:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to properly install all signage, to include internal park information and directional signs, as well as all roadway and parking area regulatory and guidance signage, as indicated in the construction plans. Park entrance signs are not included in this pay item; park entrance signs shall be paid for under **Item 30: Entrance Signs.**

The CONTRACTOR shall submit proofs of all sign placards, as well as shop drawings and technical data sheets for all sign posts, mounting hardware, sign post anchoring materials and methods, to the ENGINEER for approval prior to ordering or installing any signs or sign posts. And signage placed without approval of the ENGINEER shall be replaced by the CONTRACTOR at no additional expense to the CITY. All signage must meet or exceed applicable wind loading requirements as detailed by CITY standards, FDOT standards and specifications, and/or the Florida Building Code (Latest Edition).

Section 700 below is applicable to roadway and parking area regulatory and traffic guidance signage. All roadway and parking area signage must conform to the requirements and specifications of the Florida Department of Transportation (FDOT).

SECTION 700
HIGHWAY SIGNING

700-1 General Requirements.

700-1.1 Description: Furnish and erect roadway signs at the locations, and in accordance with the details, shown in the Plans.
The CITY designates ground traffic signs as signs erected on the shoulders, slopes, or medians, but not extending over the traveled roadway, and may further classify these signs as single post or multi-column.
Meet the requirements of Section 603, FDOT Standard Specifications.

700-1.2 Materials:

700-1.2.1 General: Meet the materials requirements shown in the FDOT Specifications and Design Standards and any additional requirements identified in the Plans.

700-1.2.2 Concrete: Use concrete meeting the requirements of Section 346, FDOT Standard Specifications. Obtain concrete from a plant that is listed on the

FDOT Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105, FDOT Standard Specifications.

700-1.2.3 Static Sign Assembly Requirements: All sign panels shall be aluminum unless otherwise shown in the Plans. Sheets and plates for sign panels shall meet the requirements of ASTM B209, Aluminum Association Alloy 6061-T6, 5154-H38 or 5052-H38. Sign panels for single column ground mounted signs shall utilize aluminum plate with a minimum thickness of 0.08 inches. All other sign panels shall utilize aluminum plate with a minimum thickness of 0.125 inches. All panels shall have rounded corners.

700-1.2.4 Retroreflective Sign Sheeting: Use signs that meet the material and process requirements of Section 994, FDOT Standard Specifications.
Use Type XI sheeting for all regulatory, warning and overhead signs.
Do not mix signs having fluorescent yellow-green sheeting with signs having yellow retroreflective sheeting.
Use Type IV sheeting for all other signs.

700-1.3 Sign Fabrication Requirements: Obtain multi-post and overhead sign structures from a facility that is listed on the FDOT Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105, FDOT Standard Specifications.

700-1.4 Storage, Handling and Labeling: If signs are stored prior to installation, store them in accordance with the manufacturer's recommendations. Properly package signs to protect them during storage, shipment and handling to prevent damage to the sign face and panel.
In addition to the information required in Section 994, FDOT Standard Specifications all permanent roadway signs must be labeled on the back bottom edge with the date of installation. Make the labels unobtrusive, but legible enough to be easily read by an observer on the ground when the sign is in its final position. Apply the label in a manner that is at least as durable as the sign face.

700-1.5 Acceptance of Signs:

700-1.5.1 Sign Inspection: Provide certification that the sign assembly meets the material and installation requirements of the Contract Documents. The ENGINEER will inspect the signs upon delivery to the storage or project site and again at the final construction inspection. Repair and replace signs deemed unacceptable by the ENGINEER at no expense to the CITY.

700-1.5.2 Imperfections and Repairs: Repair or replace signs containing imperfections or damage regardless of the kind, type, or cause of the imperfections or damage. For sign panels exceeding 30 square feet, the CONTRACTOR may make one patch, if necessary, to each sign panel not to exceed two square inches. Make repairs according to the manufacturer's recommendations and to the satisfaction of the ENGINEER. Ensure that completed repairs provide a level of quality necessary to maintain the service life of the sign and are satisfactory in appearance to the ENGINEER.

700-2 Static Signs.

700-2.1 Ground Mounted Signs: Ground mounted signs consist of both single column and multi-column static signs.

700-2.1.1 Materials: Use aluminum tubing materials meeting the general provisions of Section 965, FDOT Standard Specifications for all single column ground signs. Multi-column signs must be galvanized steel W or S beams steel columns meeting the general provisions of Section 962, FDOT Standard Specifications. All materials must meet the requirements of the appropriate FDOT Design Standard.

700-2.1.2 Fabrication of Panel Messages: Fabricate standard sign panel messages in accordance with details included in the Standard Highway Signs (SHS) manual published by the U.S. Department of Transportation. Submit shop drawings to the ENGINEER for approval prior to ordering sign panels.

700-2.1.3 Foundation: Construct foundations in accordance with the applicable FDOT Design Standards. The CONTRACTOR may use precast foundations in augured or excavated holes a minimum of 12 inches larger than each axis dimension of the precast foundation. Obtain precast foundations from a plant that is currently on the FDOT Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105, FDOT Standard Specifications. The holes must be clean and without loose material. Temporary casing will be required if the soil is unstable. Fill the void around the precast foundation with flowable fill meeting the requirements of Section 121, FDOT Standard Specifications or use clean sand placed using hydraulic methods.

700-2.1.4 Breakaway Support Mechanisms for Ground Traffic Signs:

700-2.1.4.1 Frangible Supports: Provide support posts for all frangible sign assemblies consisting of aluminum tubes up to 3 -1/2 inches outside diameter with 3/16 inch wall thickness in accordance with the requirements in the FDOT Design Standards.

700-2.1.4.2 Slip Bases: Slip base assemblies for single column signs will use aluminum sleeves and base plates. Slip base assemblies for multi-column signs will use galvanized steel bases. All slip bases must be fabricated in accordance with the requirements of the FDOT Design Standards.

700-2.1.5 Installation: Verify the length of the column supports in the field prior to fabrication to permit the appropriate sign mounting height. Fabricate the supports and wind beams in accordance with the FDOT Design Standards. Columns must be plumb and panels must be level with the proper orientation.

700-2.1.6 Retroreflective Strips for Signs: Section deleted – not applicable.

If the CONTRACTOR notes conflicts or visibility issues with a particular sign placement as detailed in the plans, the CONTRACTOR will notify the ENGINEER prior to sign installation, to determine and approve an alternate location. Any signage not installed in the original location as depicted on the Plans, without the approval of the ENGINEER, will be relocated and/or replaced at the CONTRACTOR's expense.

Any signage marking products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR'S expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Signage** shall be LUMP SUM.

Item 27 **Striping:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provisions needed to apply painted striping and markings along the access roadway, parking areas and boat ramp turning and backing areas, as indicated in the construction plans. All products, dimensions, testing methods, application methods, etc. must conform to the requirements and specifications of the Florida Department of Transportation (FDOT).

SECTION 710
PAINTED PAVEMENT MARKINGS

710-1 Description.
Apply painted pavement markings, in accordance with the Contract Documents.

710-2 Materials.
Use only materials listed on the Department's Approved Product List (APL) meeting the following requirements:

Raised Retroreflective Pavement Markers and Bituminous Adhesive Section 970, FDOT Std. Specifications
Standard Paint Sections 971-1 and 971-3, FDOT Std. Specifications
Durable Paint Sections 971-1 and 971-4, FDOT Std. Specifications
Glass Spheres Sections 971-1 and 971-2, FDOT Std. Specifications

The ENGINEER may take random samples of all material in accordance with FDOT's Sampling, Testing and Reporting Guide schedule.

710-3 Equipment.
Use equipment that will produce continuous uniform dimensions of pavement markings of varying widths and meet the following requirements:
1. Capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of paint and capable of following straight lines and making normal curves in a true arc.
2. Capable of applying glass spheres to the surface of the completed line by an automatic sphere dispenser attached to the pavement marking machine such that the glass spheres are dispensed closely behind the installed line. Use a glass spheres dispenser equipped with an automatic cut-off control that is synchronized with the cut-off of the paint and applies the glass spheres in a manner such that the spheres appear uniform on the entire pavement markings surface.
3. Capable of spraying the paint to the required thickness and width without thinning of the paint. Equip the paint tank with nozzles equipped with cut-off valves, which will apply broken or skip lines automatically.

710-4 Application.

710-4.1 General: Remove existing pavement markings, such that scars or traces of removed markings will not conflict with new pavement markings, by a method approved by the ENGINEER. Before applying pavement markings, remove any material that would adversely affect the bond of the pavement markings by a method approved by the ENGINEER. Apply standard paint to dry surfaces only, and when the ambient air and surface temperature is at least 40ºF and rising.
Apply durable paint to dry surfaces only. Do not apply durable paint when the ambient air and surface temperature is below 50°F, relative humidity is above 80% or when the dew point is within 5°F of the ambient air temperature. Do not apply painted pavement markings when winds are sufficient to cause spray dust. Apply painted pavement markings, having well defined edges, over existing pavement markings such that not more than 2 inches on either end and not more than 1 inch on either side is visible. When stencils are used to apply symbols and messages, the areas covered by the stencil reinforcing will not be required to be painted. Mix the paint thoroughly prior to pouring into the painting machine. Apply paint to the pavement by spray or other means approved by the Engineer. Conduct field testing in accordance with FDOT FM 5-541. Remove and replace painted pavement markings not meeting the requirements of this Section at no additional cost to the CITY. Apply all pavement markings prior to opening the road to traffic.

710-4.1.1 Painted Pavement Markings (Final Surface): When permanent pavement markings (i.e., thermoplastic or permanent tape), are placed on concrete surfaces or newly constructed asphalt without rumble striping, the painted pavement markings (final surface) will include one application of standard paint and one application of Class B retroreflective pavement markers applied to the final surface. Wait at least 14 days after the application of painted pavement markings (final surface) to apply the thermoplastic. No minimum wait period is required for permanent tape. When permanent pavement markings are placed on newly constructed asphalt with rumble striping, apply two applications of standard paint, one application of Class D retroreflective pavement markers, if applicable, and one application of Class B retroreflective pavement markers. For center line rumble striping installations, install Class D retroreflective pavement markers, remove them prior to grinding, and install Class B retroreflective pavement markers on the non-ground surface after grinding. A second application of standard paint must be applied within 24 hours of each day's grinding operation. Wait at least 14 days after the first application of painted pavement markings (final surface) to apply the thermoplastic. When no permanent pavement markings are placed, the painted pavement markings (final surface) will include two applications of standard paint and one application of Class B retroreflective pavement markers applied to the final surface. Wait at least 14 days after the first application of painted pavement markings (final surface) to apply the second application of paint. Apply all retroreflective pavement markers in accordance with FDOT Design Standards, Index No. 17352, prior to opening the road to traffic. The final application of pavement markings must be applied prior to final acceptance of the project. Apply all temporary retroreflective pavement markers meeting the requirements of Section 102, FDOT Standard Specifications. Apply all permanent retroreflective pavement markers meeting the requirements of Section 706, FDOT Standard Specifications.

710-4.2 Thickness: Apply standard paint to attain a minimum wet film thickness in accordance with the manufacturer's recommendations. Apply durable paint to attain a minimum wet film thickness of 0.025 inches or 25 mils. Measure, record, and certify on an FDOT approved form and submit to the ENGINEER, the

thickness of white and yellow durable paint pavement markings in accordance with FDOT FM 5-541.

710-4.3 Retroreflectivity: Apply white and yellow standard paint that will attain an initial retroreflectance of not less than 300 mcd/lx·m2 and not less than 250 mcd/lx·m2, respectively. Apply white and yellow durable paint that will attain an initial retroreflectance of not less than 450 mcd/lx·m2 and not less than 300 mcd/lx·m2, respectively. Measure, record and certify on an FDOT approved form and submit to the ENGINEER, the retroreflectivity of white and yellow pavement markings in accordance with FDOT FM 5-541. The CITY reserves the right to test the markings within three days of receipt of the CONTRACTOR's certification. Failure to afford the CITY opportunity to test the markings will result in non-payment. The test readings should be representative of the CONTRACTOR's pavement marking performance. If the retroreflectivity values measure below values shown above, reapply the pavement marking at no additional cost to the CITY. For standard paint, ensure that the minimum retroreflectance of white and yellow pavement markings are not less than 150 mcd/lx m2. If the retroreflectivity values for standard paint fall below the 150 mcd/lx m2 value within 180 days of initial application, the pavement marking will be reapplied at the CONTRACTOR's expense. If the retroreflectivity values for durable paint fall below the initial values of 450 mcd/lx m2 value for white and 300 mcd/lx m2 for yellow within 180 days of initial application, the pavement marking will be reapplied at the CONTRACTOR's expense.

710-4.4 Color: Use paint material that meets the requirements of 971-1.

710-4.5 Glass Spheres: Apply glass spheres on all pavement markings immediately and uniformly following the paint application. The rate of application shall be based on the manufacturer's recommendation. For longitudinal durable paint markings, apply a double drop of Type 1 and Type 3 glass spheres. For transverse durable paint markings, apply a single drop of Type 3 glass spheres. The rate of application shall be based on the manufacturer's recommendation.

710-5 Tolerances in Dimensions and in Alignment.
Establish tack points at appropriate intervals for use in aligning pavement markings, and set a stringline from such points to achieve accuracy.

710-5.1 Dimensions:

710-5.1.1 Longitudinal Lines: Apply painted skip line segments with no more than plus or minus 12 inches variance, so that over-tolerance and under-tolerance lengths between skip line and the gap will approximately balance. Apply longitudinal lines at least 2 inches from construction joints of portland cement concrete pavement.

710-5.1.2 Transverse Markings, Gore Markings, Arrows, and Messages: Apply paint in multiple passes when the marking cannot be completed in one pass, with an overall line width allowable tolerance of plus or minus 1 inch.

710-5.1.3 Contrast Lines: Use black paint to provide contrast on concrete or light asphalt pavement, when specified by the Engineer. Apply black paint in 10 foot segments following each longitudinal skip line.

710-5.2 Alignment: Apply painted pavement markings that will not deviate more than 1 inch from the stringline on tangents and curves one degree or less. Apply painted pavement markings that will not deviate more than 2 inches from the stringline on curves greater than one degree. Apply painted edge markings uniformly, not less than 2 inches or more than 4 inches from the edge of pavement, without noticeable breaks or deviations in alignment or width.
Remove and replace at no additional cost to the COUNTY, pavement markings that deviate more than the above stated requirements.

710-5.3 Correction Rates: Make corrections of variations in width at a maximum rate of 10 feet for each 0.5 inch of correction. Make corrections of variations in alignment at a maximum rate of 25 feet for each 1 inch of correction, to return to the stringline.

710-6 Contractor's Responsibility for Notification.
Notify the ENGINEER prior to the placement of the materials. Furnish the ENGINEER with the manufacturer's name and batch numbers of the materials and glass spheres to be used. Ensure that the approved batch numbers appear on the materials and glass spheres packages.

710-7 Protection of Newly Applied Pavement Markings.
Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the COUNTY.

710-8 Corrections for Deficiencies to Applied Painted Pavement Markings.
Reapply a 500 foot section, centered around any deficiency, at no additional cost to the CITY.

710-9 Submittals.

710-9.1 Submittal Instructions: Prepare a certification of quantities, using the current FDOT approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the ENGINEER. The CITY will not pay for any disputed items until the ENGINEER approves the certification of quantities.

710-9.2 Contractor's Certification of Quantities: Request payment by submitting a certification of quantities as directed by the ENGINEER, based on the amount of work done or completed.

Any pavement marking products or materials purchased or applied prior to shop drawing approval will need to be replaced at the CONTRACTOR'S expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Striping** is LUMP SUM.

Item 28 **Entry Gateway:**
The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to fabricate and construct park entry gateway as indicated in the construction plans.

Shop drawings, technical data sheets, material samples and cut sheets, color chips, and other information detailing the fabrication and assembly of the gateway and its supporting foundations shall be submitted for approval by the ENGINEER and by the CITY before construction begins. The design of the foundations and the assembled gateway must be signed and sealed by a structural engineer with a current Professional Engineer registration in the State of Florida. The structural engineer must provide a statement that the assembled gateway meets or exceeds applicable wind loading requirements as detailed by CITY standards, and/or the Florida Building Code (Latest Edition). The ENGINEER will not approve any items without the required structural certifications. Any items assembled or constructed prior to approval by the ENGINEER shall be replaced by the CONTRACTOR at no additional expense to the CITY.

The basis of payment for **Entry Gateway** shall be LUMP SUM.

Item 29 **Flag Pole:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and any other provision needed to construct the flag pole as per the construction plans. The cost for flagpole lighting shall be included in the unit cost for **Item 58 (Lighting, Electrical Distribution, Service Connections).**

Shop drawings, technical data sheets, material samples and cut sheets, and other information detailing the fabrication and installation of the flag pole and its supporting foundation shall be submitted for approval by the ENGINEER and by the CITY before construction begins. The design of the flag pole and the assembled gateway must be signed and sealed by a structural engineer with a current Professional Engineer registration in the State of Florida. The structural engineer must provide a statement that the installed flag pole meets or exceeds applicable wind loading requirements as detailed by CITY standards, and/or the Florida Building Code (Latest Edition). The ENGINEER will not approve any items without the required structural certifications. Any items assembled or constructed prior to approval by the ENGINEER shall be replaced by the CONTRACTOR at no additional expense to the CITY.

The basis of payment for **Flag Pole** shall be LUMP SUM.

Item 30 **Entrance Signs:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct the entrance signs as per Detail 5H-3, Sheet H-3 of the construction plans. The CONTRACTOR shall coordinate with B & C Signs, Inc. to produce entrance signs which match the appearance of the CITY's standard signage for the entrances to CITY owned parks and other facilities.The contact information for B & C Signs, Inc. is given below.

B & C Signs, Inc.
2225 Guava Drive
Edgewater, FL 32141
(386) 426-2373
BandCsigns.com

The entrance signs must meet all applicable sections of the City of Edgewater Standards and the Florida Building Code (Latest Edition). The CONTRACTOR

shall submit proofs, shop drawings, and technical data sheets for the entrance signs and mounting hardware to the ENGINEER for approval prior to ordering or installing any materials or components. Any items install prior to ENGINEER approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Entrance Signs** is per EACH.

Item 31 **Shade Structures:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct 20' x 20' rectangular shade structures at the splash park (two structures), at the entrance to the skate park (one structure) and at the dog park (one structure) as per the construction plans.

The CONTRACTOR shall furnish 20' x 20' offset single post pyramid structures from Shade Systems, Inc., or an equal product with approval from the ENGINEER and the CITY. The post color shall be Alpine White, and the canopy shall be Light Blue Coolnet®. Site preparation and installation shall be per the MANUFACTURER's instructions and specifications; any required testing of soils or concrete at the installation site shall be included in the bid price, and all testing results shall be submitted to the ENGINEER for approval. The CONTRACTOR shall submit shop drawings, technical data sheets and installation instructions to the ENGINEER for approval prior to ordering or installing structures. All warranty documents shall be submitted to the CITY at project closeout. Any shade structures installed without the required approvals shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Shade Structures** is per EACH.

Item 32 **New Building (1,040 sq ft; incl. electrical & plumbing):**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct the restroom/ splash park equipment room building. This item includes all electrical, plumbing and mechanical items WITHIN the building, including all fixtures, appliances and other appurtenances; an asphalt shingle roof; and all connections necessary to connect the building to water, sanitary sewer, and electrical services. Utility service connections will be extended to 5 ft. away from the exterior walls of the building. All wall-mounted equipment, including but not limited to electric boxes, meters, vents, shall be painted to match adjacent wall.

The CONTRACTOR shall submit shop drawings, cut sheets, technical data sheets, and other supporting information on all plumbing, plumbing fixtures, electrical wiring, conduit and fixtures, appliances, restroom and utility room furnishings, equipment room mechanical and ventilation components, and all hardware and materials required for installation of these, to the ENGINEER for approval prior to purchasing or installing these items. The CONTRACTOR shall also submit samples, color chips/charts and other supporting information for all finishing items, including, but not limited to: roof materials, wall and floor tiling, exterior/interior paint, stain and/or concrete dyes/coloring agents, to the ENGINEER and the CITY for approval prior to ordering or installation. Any items installed or applied without this approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **New Building (1,040 sq ft; incl. electrical & plumbing)** is LUMP SUM.

Item 33 **Add Alternate - Substitute Aluminum Roof for Shingled Roof:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct an aluminum ridged metal roof system as a substitute for the asphalt shingle roof system specified in **Item 32: New Building (1,040 sq ft) (inc. electrical & plumbing). This is an additive alternate item: the CONTRACTOR shall determine the furnished and installed cost difference between the asphalt shingle roof system and the aluminum ridged metal roof system, and enter this value as the bid price.**

The basis of payment for **Add Alternate - Substitute Aluminum Roof for Shingled Roof** is LUMP SUM.

Item 34 **Building, Pavilion, Playground and Splash Park Water Connection:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to connect the new potable water service to the restroom, pavilion, playground, splash park equipment room and shower as indicated in the construction plans. This includes all backflow preventers etc. necessary. Please note that this includes several different size water services.

The CONTRACTOR is responsible for ensuring that the connection is in compliance with all applicable sections of the Florida Building Code (Latest Edition) and City of Edgewater standards and specifications. The CONTRACTOR must submit shop drawings detailing all components used for the connection. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Building, Pavilion, Playground and Splash Park Water Connection** is LUMP SUM.

Item 35 **Pre-Packaged Lift Station:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install a pre-packaged lift station as indicated in the construction plans.

The CONTRACTOR must submit shop drawings/ product information detailing the proposed lift station. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Pre-Packaged Lift Station** is LUMP SUM.

Item 36 **6" Gravity Sewer to Lift Station:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 6" gravity sewer to the proposed lift station indicated in the construction plans.

The CONTRACTOR is responsible for ensuring that the sewer line is in compliance with all applicable sections of the Florida Building Code (Latest Edition) and City of Edgewater standards and specifications. The CONTRACTOR must submit shop drawings detailing all components used for the water line. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **6" Gravity Sewer to Lift Station** is per LINEAR FOOT.

Item 37 **2" PVC Force Main:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 2" PVC Force Main as indicated in the construction plans.

The CONTRACTOR is responsible for ensuring that the main is in compliance with all applicable sections of the Florida Building Code (Latest Edition) and City of Edgewater standards and specifications. The CONTRACTOR must submit shop drawings detailing all components used for the water line. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **2" PVC Force Main** is per LINEAR FOOT.

Item 38 **Renovation Existing Restroom (1,152 sq ft) (inc. electrical & plumbing):**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to renovate the interior and exterior of the existing restroom and concession building as per the construction plans. This item includes all electrical, plumbing and mechanical items WITHIN the building, including all restroom fixtures, and furnishings, and an asphalt shingle roof.

The CONTRACTOR shall submit shop drawings, cut sheets, technical data sheets, and other supporting information on all plumbing, plumbing fixtures, electrical wiring, conduit and fixtures, appliances, restroom and utility room furnishings, equipment room mechanical and ventilation components, and all hardware and materials required for installation of these, to the ENGINEER for approval prior to purchasing or installing these items. The CONTRACTOR shall also submit samples, color chips/charts and other supporting information for all finishing items, including, but not limited to: roof materials, wall and floor tiling, exterior/interior paint, stain and/or concrete dyes/coloring agents, to the ENGINEER and the CITY for approval prior to ordering or installation. Any items installed or applied without this approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Renovation Existing Restroom (1,152 sq ft) (incl. electrical & plumbing)** is LUMP SUM.

Item 39 **Add Alternate - Substitute Aluminum Roof for Shingled Roof:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct an aluminum ridged metal roof system as a substitute for the asphalt shingle roof system specified in **Item 37: Renovation Existing Restroom (1,152 sq ft) (inc. electrical & plumbing). This is an additive alternate item: the CONTRACTOR shall determine the furnished and installed cost difference between the asphalt shingle roof system and the aluminum ridged metal roof system, and enter this value as the bid price.**

The basis of payment for **Add Alternate - Substitute Aluminum Roof for Shingled Roof** is LUMP SUM.

Item 40 **Splash Park:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, plumbing and hardware needed to construct the Splash Park as indicated in the plans. This also includes all compaction, foundation, surfacing, water features etc. to complete the Splashpark per plans.

The CONTRACTOR must submit shop drawings detailing the surface, connections, pumps, control panels, etc. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Splash Park** is LUMP SUM.

SECTION 13 15 00

INTERACTIVE WATER FEATURE

PART 1 - GENERAL

1.1 SUMMARY

A. Work in this section includes all labor, materials, equipment and other services necessary to furnish and install a complete and working Interactive Water Feature to meet the criteria reflected in the drawings and specifications, in compliance with all applicable codes. The Quality Assurance specifications below are intended to provide that only those entities that are well familiar with the design and installation of Interactive Water Features, and their detailed requirements by Florida state and local authorities, shall be allowed to undertake this work. As such, this scope of work shall include a fully functional and code compliant installation, regardless of whether any necessary details of work are specifically shown or called for on the drawings and specifications, and the installing contractor shall use his or her expertise to identify any such requirements prior to bidding the work, and include them. If any additional work or change to the work as shown or called for in the contract documents is subsequently found to be required in order to provide a fully functional and code

compliant Interactive Water Feature installation, it shall be included at the installing contractor's own cost and expense.

1. F1.1 Site Plan
2. F1.2 Feature Plan
3. F1.3 Piping Plan
4. F2.1 Material List
5. F2.2 Schematic
6. F2.3 Equipment Area
7. F3.1 Details

B. Related work in this section includes the following:

1. Division 3 Concrete
2. Division 4 Masonry
3. Division 15 Mechanical
4. Division 16 Electrical

C. Qualifications for Interactive Water Feature Subcontractor:

1. See Bidders Qualifications Form

1.2 REFERENCES AND STANDARDS

A. ANSI and ASTM

B. Underwriter's Laboratory (UL)

C. National Electrical Code (NEC)

D. National Fire Protection Agency (NFPA)

E. National Sanitation Foundation (NSF)

F. Florida Department of Health (DOH)

H. Building Codes: all work shall conform to the Florida Building Code and other state or local codes as applicable.

1.3 System Requirements

A. Interactive Water Feature Operation Statement: This Interactive Water Feature will be a pool-less fountain with jets flush mounted in a hardscape deck surface. The feature will include a total of twenty-eight (28) ground jets arranged in concentric circular patterns and nine architectural features. The ground jets are controlled in four groups, to spray water onto the concrete feature deck. Separate display pumps for each ground jet group are controlled by variable frequency drives in concert with the programmable animation controller. The architectural features will be fed by a dedicated display pump. The water is collected in a system of area drains and channeled to a remotely located collector tank, where it is filtered, sanitized and recirculated back to the feature jets. An activation bollard located near the feature will signal a programmable controller within the feature control panel to turn on the jets for a preset time period when it is "swiped" by a participant. The feature water level will be automatically maintained by an electronic solenoid valve controlled fill system. The display water is 100% filtered before returning the features. The concrete collector tank with top slab is designed to Florida DOT specs for H20 loading, which makes it inherently resistant to hydrostatic uplift when the tank is completely emptied. This play feature will be operated as an Interactive Water Feature and shall be constructed in compliance with and as prescribed by the Florida Administrative Code 64-E, FBCB 454 and all other applicable building codes.

1.4 SUBMITTALS

A. Refer to and comply with Division 1 for procedures and additional submittal criteria.

B. The Interactive Water Feature contractor shall provide a complete submittal package to include drawings and catalog cut sheets on all equipment for the Interactive Water Feature system to the Engineer for evaluation and approval of compliance with the specifications, prior to incorporating them in the project.

1. Submit drawings including plan view of IWF, equipment/collector tank area, intended pipe routing, piping and electrical schematics, and equipment installation details, and other details as required for permitting.
2. Submit manufacturer's data for all equipment and components.
3. Submit a complete controls package including control panel schematics, component layout and manufacturer's data on each individual component.
4. Submit manufacturer's shop drawings on the precast concrete collector tank and its modular equipment slab with penetration details.
5. Submit a complete package of submittals. Partial submittals will not be reviewed.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article 1.4, submit the completed IWF Bidder Qualifications form at the time of bid. Firms and persons submitted are subject to Owner's approval.

1.5 QUALITY ASSURANCE

A. The intention of these specifications is to ensure that a qualified Interactive Water Feature Equipment Manufacturer/Supplier and Contractor provide a system with

single source responsibility for the Interactive Water Feature system and its components.

B. Interactive Water Feature Equipment Manufacturer/Supplier: The Interactive Water Feature Equipment Manufacturer/Supplier shall specialize in the manufacture and supply of Interactive Water Feature specialty products with a minimum of ten (10) years documented experience. All specialty products including the electrical control panel shall be furnished by a single Interactive Water Feature Equipment Manufacturer/Supplier. Piece mealing unrelated components is not allowed.

C. Interactive Water Feature Contractor Qualifications: The Interactive Water Feature contractor shall be in the business of designing and installing Interactive Water Features for a period of not less than ten (10) years and shall have designed and installed at least five (5) IWF projects similar in cost, size and complexity to this project.

D. Additional trade qualifications are required as follow:

A. Interactive Water Feature Electrician: The Electrician that will perform work on the Interactive Water Feature shall be licensed to work in the state and city of this project location, shall have a complete understanding of IWF electrical requirements, and shall have served as the Electrician on no less than three (3) interactive water features of equal complexity.

B. Interactive Water Feature Controls and Panels manufacturer: The controls and operation of the feature are such that only specialized pre-approved suppliers are to furnish the water feature control and logic system. Changes to the source of supply shall appear on the bid documents. The engineer at his sole discretion can elect to accept or reject substitution proposals. Substitutions after the award of the project will not be considered. Any election to substitute the specialty controls manufacturer must be accompanied with documentation proving the successful design and implementation of no less than 5 interactive water features of equal value and complexity. All panel manufactures must be actively involved in the specialized IWF controls industry.

C. The animation and systems programming shall be performed by a person with experience on at least three (3) similar choreographed Interactive Water Features. The individual must be proficient in PLC programming with fountain spray jets and lighting choreography. A curriculum vitae may be requested to adjudicate the programmers ability. The owner shall have the option of accepting the experience of the programmer for this water feature.

E. Substitutions:

A. The Interactive Water Feature has been engineered after careful design consideration by the Owner and Architect, and the specified equipment, materials and products are selected to ensure the required effects and results for the IWF design. Any substitutions that may modify or change the design in any manner, will not be considered or allowed.

B. Substitutions shall be equal to the specified products in every regard as to function, fit, quality, durability, operational efficiency, maintainability, and aesthetic appearance where applicable.

C. Only substitutions that are identified on the qualification form submitted with the bid will be allowed for use on the project. Substitutions after the bid date will only be considered if they meet one or more of the following conditions.
   A. The specified product does not meet current code and cannot receive necessary approval by a governing authority, and the requested substitution does meet code and can be approved.
   B. The specified product is not compatible with other specified materials or methods of construction, and the substitution can overcome the incompatibility.
   C. The specified product cannot provide a warranty required by the Contract Documents and the proposed substitution can provide the required warranty.

D. The Engineer will not approve any substitution if the specified product or method of construction cannot be provided merely as a result of the Contractor's failure to timely submit, or promptly pursue, or properly coordinate the work.

E. The Contractor shall have completed at least two (2) successful IWF projects with products supplied by the IWF Equipment Manufacturer /Supplier that the contractor is proposing for substitutions on this project.

F. The Contractor assumes all liability and responsibility for the proper fit, function and compatibility with the overall IWF design for any Engineer accepted substitution and remains responsible to provide a fully functional and code compliant Interactive Water Feature installation without additional cost to the Owner.

F. As Built Drawings - Maintain a current set of drawings showing installed locations of piping systems and conduits particular to the Interactive Water Feature. Record accurate reference dimensions measured from at least two permanent reference points. The drawings shall be located on site at all times during construction and shall be made available to the Engineer upon request.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original packaging with legible manufacturer's identification.

B. Materials shall arrive on site in good condition, free of gouges, scratches or dents.

C. Store materials in a secure place and in strict accordance with manufacturer's recommendations.

1.7 WARRANTY

A. The Interactive Water Feature contractor shall guarantee that any equipment found defective within one year of the final acceptance shall be replaced at no cost to the owner.

B. The guarantee does not extend to damage incurred through improper operation and maintenance by the owner. The owner will assume full responsibility for the proper operation and maintenance of the Interactive Water Feature upon final acceptance.

PART 2 - PRODUCTS

2.1 IN POOL COMPONENTS

A. Feature N1: Vertical Crown Jet - cast bronze construction, multi orifice soft spray nozzle w/ vertical spray, removable faceplate, 1" female n.p.t. conn. Freeport #N1910 or approved equal

B. Feature N2: Arcing Crown Jet - cast bronze construction, multi orifice spray nozzle w/ arcing spray 15 degrees off center, removable faceplate, 1" female n.p.t. conn. Freeport NF1910 or approved equal

C. Feature N3: Snake Ground Jet – cast bronze construction, 1/4” orifice spray nozzle w/ vertical spray, removable faceplate, 1" female n.p.t. conn. Freeport #N1910 or approved equal

D. Feature N4: Tri-Cluster Ground Jet - cast bronze construction, 3/8” orifice spray nozzle w/ vertical spray, removable faceplate, 1" female n.p.t. conn. Freeport #N1910 or approved equal

E. Feature N5: Soft Column Ground Jet - cast bronze construction, multi orifice soft spray nozzle w/ vertical spray, removable faceplate, 1" female n.p.t. conn. Freeport #N1910 or approved equal

F. Feature N6: Clear Stream Ground Jet - cast bronze construction, 3/8” orifice spray nozzle w/ vertical spray, removable faceplate, 1" female n.p.t. conn. Freeport #N1910 or approved equal

G. Feature N7: Arcing Ground Jet - cast bronze construction, 3/8” orifice spray nozzle w/ 25 degree adjustment, removable faceplate, 1" female n.p.t. conn. Freeport #N1910 or approved equal

H. Feature N8: Large Soft Column Ground Jet - cast bronze construction, multi orifice soft spray nozzle w/ vertical spray, removable faceplate, 2" female n.p.t. conn. Freeport #N1920 or approved equal

I. Feature N9: Ring Array – sch. 80 PVC construction, (24) 3/16” orifice spray nozzle w/ vertical spray, 2" female inlet conn. Freeport #N2348 or approved equal

J. Inlet Fitting: White cycolac construction, 1-1/2" inside slip connection, ½” directionally adjustable orifice. Freeport #F115P or approved equal

K. Large Area Drain: 18”x18”x12” fiberglass sump with 6” bottom slip PVC conn., 18”x18” cast bronze grate with stainless steel fasteners. Freeport #F560 or approved equal

L. Rinse Shower: Stainless steel construction with a powder coat finish. Most Dependable Fountains #500 SM or approved equal

2.2 ELECTRICAL COMPONENTS

A. Water Level Sensor: Normally closed narrow throw level float switches with stainless steel fitted bronze junction box. Neoprene gaskets and cord seal connectors. Freeport #F 1460 or approved equal.

2.3 PUMPING SYSTEM COMPONENTS

A. Feature Pump 15 HP: Thermoplastic construction, 6" suction, 4" discharge, 208-230/460 volt, 3 phase, 3550 RPM, 60 Hz motor, self-priming, NSF Listed. Pentair EQK Series or approved equal.

B. Sand Filter: Dual filters, fiberglass construction with 4” conn., 21.64 square foot filter area each filter, NSF Listed. Fluidra 06684 or approved equal.

C. Chemical Feed Pumps: Polycarbonate enclosure, 3 point HDPE head roller, 3/8” polyethylene suction and discharge tubing, check valve, 120 volt, single phase, 60 Hz. Motor, adjustable flow rate, UL listed, conforms to NSF-50. Stenner 45M Series or approved equal.

D. Chemical Storage Tanks: One piece, linear polyethylene construction, cylindrical with flat bottom and vented manway. Chemtainer or approved equal.

2.4 VALVES

A. For throttling operation 2" and smaller: true union ball valves with PVC body, Teflon backed with EPDM seats, EPDM seals, socket connections.

B. For throttling operation 3" and larger: wafer type butterfly valves with glass filled polypropylene body, PVC disk, stainless steel stem, EPDM seal, 3" through 6" valves with infinite position lever handles, 8" and larger valves with infinite position gear handles.

C. For shut-off operation 2" and smaller: true union ball valves with PVC body, Teflon backed with EPDM seats, EPDM seals, socket connections.

D. For shut-off operation 3" and larger: wafer type butterfly valves with glass filled polypropylene body, PVC disk, stainless steel stem, EPDM seal, and infinite position lever handles.

E. Solenoid Fill Valves: normally closed, slow closing, 2 way with brass body, Buna N seats, Type 1 general purpose enclosure with 120 volt solenoid.

F. Animation Valve: normally closed globe style, glass-filled nylon body and bonnet,

self-cleaning nylon scrubber with stainless steel screen, pressure regulator module, 24 volt, 60 Hz. AC solenoid.

2.5 ELECTRICAL CONTROL COMPONENTS

A. Chemical Controller: A modular design from a single source including a digital controller mounted in a polystyrene cabinet with automatic ORP control from 400 to 900 mV and pH control from 7.0 to 8.0, LED ORP and pH readouts, manual and automatic modes, adjustable set points, alarm limits and feed rates, visual and relay alarms; a flow cell assembly with connections for bypass line, sensors, a rotary flow switch and a water testing spigot; commercial grade ORP and pH sensors. Chemtrol 250 with FCA or approved equal.

B. Control Panel: A control panel shall consist of an enclosure, control devices, circuit breakers, switches, relays, terminal strips and interconnecting wiring as necessary. All components in the control panel as well as the entire assembly shall be U.L. listed and labelled. The control panel shall include:

A. NEMA 4 steel enclosure sized as required.
B. A main breaker with through door disconnect for 120/208 volt, 3 phase service.
C. Separate door mounted hand operated HOA switches, run lights and circuit breaker for each pump and lights.
D. Motor starter for recirculation pump.
E. Variable frequency drive for each feature pump.
F. Control circuit breakers and transformers as necessary.
G. Water Level Monitor, Freeport #E101 or approved equal.
H. An animation controller with (8) digital inputs, (8) digital outputs and (6) 0-10 VDC analog outputs.
I. A door mounted, three position program selector switch.
J. A door mounted, two way drain switch.
K. Separate 24 hour timing circuits for display, filter pumps and lights.
L. Lighting circuit breakers.
M. Lighting contactors.
N. Lighting power supplies.
O. UL 508 label.

C. Provide animation controller programming of show as follows:

1. Provide a daytime show displaying the full range of jet display combinations with rhythmic movements and playful interaction of the water effects. Allow for periods of decreased jet heights near the periphery to encourage interaction with younger guests while maximizing waterplay toward the interior of the feature. Program the show to loop continuously for a set time whenever called for by the activation bollard. The show shall be a minimum of 6 minutes duration, looped continuously when activated by the activation bollard.

2. Shows shall be written to demonstrate the full range and capability of the system, and then demonstrated for the Owner to review. Contractor shall make modifications to the show one time, adjusting it to the written comments and direction (if any) from the Owner after their initial review.

2.6 PUMP AREA AND COLLECTOR TANK

A. Collector Tank: The collector tank will have inside dimensions of at least 10’-0"' x 10'-0” x 5'-6", and be sized to accommodate the required rates of flow. It will be built to Florida DOT standards for H-20 loading. The tank will be waterproofed with integral crystalline waterproofing and Ramneck waterstop at each filed joint. Pipe and conduit penetrations will be sealed using watertight Mechanical Seals with stainless steel fasteners or cast in place with integral waterstops. Freeport #PV1010D or approved equal. Tanks fabricated of materials other than reinforced concrete, or any which rely on external ballast to resist hydrostatic uplift, will not be acceptable alternates. Access will be provided by a lockable 30”x30”"' single leaf aluminum hatch equipped with lifting aids.

PART 3 – EXECUTION

3.1 PIPING MATERIALS

A. All pipe located within the pool and all pipes penetrating the pool floor shall be red brass or hard tempered copper type "L".

B. The cold water supply piping shall be type "L" copper with forged copper fittings or sch. 80 PVC.

C. Underground pipe and fittings shall be sch. 40 Type 1 PVC. All slip PVC fitting shall be sch. 40; all threaded PVC fittings shall be sch. 80.

D. All exposed pipe and fittings and all pipe and fittings in the pump equipment area shall be sch. 80 PVC.

3.2 TESTING AND BALANCE

A. All pipes shall be hydrostatically tested at 50 psig for a minimum of 8 hours without any discernable pressure drop.

B. All pipes shall be flushed of debris before start up of fountain.

C. The fountain contractor shall be responsible for initial fill, start up, establishing proper water chemistry, testing, and programming of the fountain systems and adjustment of flows to meet the specified operation.

3.3 ELECTRICAL

A. The fountain contractor shall be responsible for installing all conduit and wiring in and between the fountain, pumping equipment, solenoid valves, transformers, and fountain control panels.

B. All electrical conductors shall be installed in nonmetallic conduit except for flexible conduit not longer than four feet in length for connection to equipment subject to vibration.

END OF SECTION 02820

Interactive Water Feature
Bidder Qualifications

To be completed and submitted with Bid Form

Name of Prime Bidder: _____

In accordance with specification section 02820-2 subsection 1.04 paragraph C, the following is provided as testimony to the below named Interactive Water Feature Contractor's compliance with the qualification requirements.

Name of Interactive Water Feature Contractor:_____

Prepared by:_____ Date: _____

Interactive Water Feature (IWF) Project Reference # 1:

Project Name _____ FL DOH IWF Permit # _____

Project Location _____ Sq. Footage of IWF _____

Number of Vertical Spray Jets _____ Number of Uplight Fixtures _____

Project Owner _____ Owner Contact _____

Contact Email _____ Contact Phone _____

General Contractor _____ GC Contact _____

Contact Email _____ Contact Phone _____

Date of IWF project completion _____

Interactive Water Feature (IWF) Project Reference # 2:

Project Name _____ FL DOH IWF Permit # _____

Project Location _____ Sq. Footage of IWF _____

Number of Vertical Spray Jets _____ Number of Uplight Fixtures _____

Project Owner _____ Owner Contact _____

Contact Email _____ Contact Phone _____

General Contractor _____ GC Contact _____

Contact Email _____ Contact Phone _____

Date of IWF project completion _____

Interactive Water Feature (IWF) Project Reference # 3:

Project Name _____ FL DOH IWF Permit # _____

Project Location _____ Sq. Footage of IWF _____

Number of Vertical Spray Jets _____ Number of Uplight Fixtures _____

Project Owner _____ Owner Contact _____

Contact Email _____ Contact Phone _____

General Contractor _____ GC Contact _____

Contact Email _____ Contact Phone _____

Date of IWF project completion _____

Interactive Water Feature (IWF) Project Reference # 4:

Project Name _____ FL DOH IWF Permit # _____

Project Location _____ Sq. Footage of IWF _____

Number of Vertical Spray Jets _____ Number of Uplight Fixtures _____

Project Owner _____ Owner Contact _____

Contact Email _____ Contact Phone _____

General Contractor _____ GC Contact _____

Contact Email _____ Contact Phone _____

Date of IWF project completion _____

Interactive Water Feature (IWF) Project Reference # 5:

Project Name _____ FL DOH IWF Permit # _____

Project Location _____ Sq. Footage of IWF _____

Number of Vertical Spray Jets _____ Number of Uplight Fixtures _____

Project Owner _____ Owner Contact _____

Contact Email _____ Contact Phone _____

General Contractor _____ GC Contact _____

Contact Email _____ Contact Phone _____

Date of IWF project completion _____

In accordance with specification section 02820-3 subsection 1.4 paragraph D. -1., the following is provided as testimony to the below named Interactive Water Feature Electrical Contractor's compliance with the qualification requirements.

Name of Interactive Water Feature Electrical Contractor: _____

Interactive Water Feature Electrical Contractor License number: _____

Electrical Contractor Interactive Water Feature (IWF) Project Reference # 1:

Project Name _____ IWF Electrical Permit # _____

Project Location _____ Number of Uplight Fixtures _____

IWF Contractor _____ Contact _____

Contact Email _____ Contact Phone _____

Electrical Contractor Interactive Water Feature (IWF) Project Reference # 2:

Project Name _____ IWF Electrical Permit # _____

Project Location _____ Number of Uplight Fixtures _____

IWF Contractor _____ Contact _____

Contact Email _____ Contact Phone _____

Electrical Contractor Interactive Water Feature (IWF) Project Reference # 3:

Project Name _____ IWF Electrical Permit # _____

Project Location _____ Number of Uplight Fixtures _____

IWF Contractor _____ Contact _____

Contact Email _____ Contact Phone _____

In accordance with specification section 02820-3 subsection 1.4 paragraph D. -2., the following is provided:

Name of IWF Control Panel Manufacturer _____

Specified Manufacturer? Yes___ No___

Previous IWF projects:

1._____

2._____

3._____

4._____

5._____

In accordance with specification section 02820-2 subsection 1.04 paragraph D. -3. the following is provided:

Name of Animation and Systems Programmer_____

Previous IWF programming projects:

1._____

2._____

3._____

4._____

5._____

In accordance with specification section 02820-2 subsection 1.04 B and E., the following is provided:

Name of IWF Equipment Manufacturer/Supplier_____

Specified Manufacturer/Supplier? Yes___ No___

Previous IWF projects completed by Contractor using equipment from the above named Manufacturer/Supplier:

1._____

2._____

Attach a separate sheet listing any proposed equipment substitutions. All substitutions are subject to submittal and review.

Item 41 **Splash Park Concrete Deck:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to construct the concrete deck at the splash park per the construction plans. The CONTRACTOR is advised that strict adherence with all finished grades for the concrete deck as depicted in the construction plans must be maintained, particularly at the splash park shower and shower drain area.

Prepare the bearing surface for the concrete slab in accordance with Section 4.3 (Site Preparation for Shallow Foundations) of the Geotechnical Report by Universal Engineering Sciences, Inc. (attached to these bidding documents). Bearing surface shall be treated for termites by a pesticide applicator licensed in the State of Florida prior to pouring concrete slab. A 15 mil thickness plastic vapor barrier shall be placed on bearing surface prior to placing formwork and concrete reinforcement. Concrete slab shall be sized to provide 1 ft. clearance from outside faces of pavilion columns; 4" thickness, 3000 PSI mix, reinforced with 6 x 6 x 10/10 welded wire mesh fabric, placed at 2 inches height from bottom of slab. Maintain minimum of 2 inches concrete cover over edges of welded wire mesh fabric. Use only non-metallic spacers and chairs for positioning welded wire mesh fabric. The poured slab shall be broom finished. The CONTRACTOR shall submit concrete mix design, compaction/moisture testing results, and shop drawings/cut sheets for vapor barrier and all reinforcing materials to the ENGINEER for approval prior to placing any materials or pouring any concrete. Any items placed before approval shall be removed and replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Splash Park Concrete Deck** is per SQUARE FOOT..

Item 42 **Splash Park Fencing:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct 4 ft. height, black polymer coated chain link fencing with a swing access gate at the splash park as noted on the construction plans.

The CONTRACTOR shall submit shop drawings and cut sheets for all fencing components and hardware prior to ordering or installing fencing. Any fencing installed without approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Splash Park Fencing** is LUMP SUM.

SECTION 32 31 13
CHAIN LINK FENCE AND GATES

PART 1 GENERAL
1.1 RELATED DOCUMENTS

A. DIVISION 01 - GENERAL REQUIREMENTS: Drawings, quality, product and performance requirements, general and supplemental conditions apply as applicable to the project and project documents.

1.2. SUMMARY

A. This Section includes industrial/commercial chain link fence and gates specifications:

1. Polymer coated steel chain link fabric
2. Polymer coated galvanized steel framework and fittings
3. Gates: swing and cantilever slide
4. Installation

B. Related Sections:

1.3 REFERENCES [Delete references not included in specification]

A. ASTM F552 Standard Terminology Relating to Chain Link Fencing

B. ASTM F567 Standard Practice for Installation of Chain Link Fence

C. ASTM F626 Specification for Fence Fittings

D. ASTM F668 Specification for Polymer Coated Chain Link Fence Fabric

E. ASTM F900 Specification for Industrial and Commercial Swing Gates

F ASTM F934 Specification for Standard Colors for Polymer-Coated Chain Link

G. ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework

H. ASTM F1664 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence

I. ASTM F1665 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence

1.4 SUBMITTALS

A. Shop drawings: Site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence, gates, footings and details of attachments.

B. Certifications: Manufacturers material certifications in compliance with the current ASTM specifications.

C. Specification Changes: May not be made after the date of bid.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company headquartered in the United States having U.S. manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5 years' experience.

B. Fence contractor: Company with demonstrated successful experience

installing similar projects and products in accordance with ASTM F567 and have at least 5 years' experience.

C. Tolerances: Current published edition of ASTM specifications tolerances apply. ASTM specification tolerances supersede any conflicting tolerance.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver products to site.

B. Storage: Store and protect products off the ground when required.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Framework, posts, rails, pipe for gate frames:

1. Master Halco Permafused II ® Commercial Color Chain Link Fence System

2. Equal approved by PROJECT ENGINEER.

2.2 CHAIN LINK FABRIC

A. Steel Chain Link Fabric: Heights indicated on drawings.

1. Polymer Coated Steel Fabric: ASTM F668, wire gauge specified is that of the metallic coated steel core wire; 2 in. 6 ga.
   a. Class 2b fused and adhered
   b. Color: black in compliance with ASTM F934.
   c. Fabric selvage: knuckle top and bottom.

2.3 ROUND STEEL PIPE FENCE FRAMEWORK

A. Round steel pipe and rail: Schedule 40 standard weight pipe, in accordance with ASTM F1083, 1.8 oz/ ft^2 (550 g/m^2) hot dip galvanized zinc exterior and 1.8 oz/ft^2 (550 g/m^2) hot dip galvanized zinc interior coating. Regular Grade: Minimum steel yield strength 30,000 psi (205 MPa)

1. Line post O.D. varies, refer to construction plan details. Standard weight.

2. End, Corner, Pull post O.D. varies, refer to construction plan details. Standard weight.

3. Top, brace, bottom and intermediate rails, 1.660 in. (42.2 mm) OD 2.27 lb/ft. (4.0 kg/m).

4. Polymer Coated Pipe: Polymer coated pipe shall have a Polyolefin coating fused and adhered to the exterior zinc coating of the galvanized pipe in accordance with ASTM F1043. The minimum thickness of the PVC or Polyolefin coating shall be 10-mils (0.254 mm). Color to match fabric (black) per ASTM F934.

2.4 TENSION WIRE

A. Polymer Coated Steel Tension Wire: 7 gauge (0.177 in.) (4.50 mm) wire complying with ASTM F1664. Wire gauge specified is the core wire gauge.
   a. Class 2b fused and adhered
   b. Color: black in compliance with ASTM F934.

2.7 FITTINGS

A. Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge (0.105 in.) (2.67 mm), minimum width of 3/4 in. (19 mm) and minimum zinc coating of 1.20 oz/ft² (366 g/m²). Secure bands with 5/16 in. (7.94 mm) galvanized steel carriage bolts.

B. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: In compliance to ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

C. Truss Rod Assembly: In compliance with ASTM F626, 3/8 in. (9.53 mm) diameter steel truss rod with a pressed steel tightener, minimum zinc coating of 1.2 oz/ft² (366 g/m²), assembly capable of withstanding a tension of 2,000 lbs. (970 kg).

D. Tension Bars: In compliance with ASTM F626. Galvanized steel one-piece length 2 in. (50 mm) less than the fabric height. Minimum zinc coating 1.2 oz. /ft² (366 g/m²). Bars for 2 in. (50 mm) and 1 ¾ in. (44 mm) mesh shall have a minimum cross section of 3/16 in. (4.8 mm) by 3/4 in. (19 mm).

E. Polymer Coated Color Fittings: In compliance with ASTM F626, Polyolefin coating minimum thickness 0.006 in. (0.152 mm) fused and adhered to the zinc coated fittings Color to match fabric (black) per ASTM F934.

2.8 TIE WIRE and HOG RINGS

A. 9 gauge aluminum alloy ties and hog rings per ASTM F626.
   a. Class 2b fused and adhered
   b. Color: black in compliance with ASTM F934.

2.9 SWING GATES [Delete if not required, specify gate opening and if double or single leaf if not shown on drawings]

A. Swing Gates: Galvanized steel pipe welded fabrication in compliance with ASTM F900. Gate frame members 1.900 in. OD (48.3 mm) ASTM F 1083 schedule 40 galvanized steel pipe. Frame members spaced no greater than 8 ft. (2440 mm) apart vertically and horizontally. Welded joints protected by applying zinc-rich paint in accordance with ASTM Practice A780. Positive locking gate latch, pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Provide lockable drop bar and gate holdbacks with double gates. Match gate fabric to

that of the fence system. Gateposts per ASTM F1083 schedule 40 galvanized steel pipe. 2.375 in. (60.3 mm) gatepost O.D., 3.65 lb/ft (5.4 kg/m). Polyolefin coating fused and adhered to the exterior zinc coating of the galvanized pipe in accordance with ASTM F1043. The minimum thickness of the PVC or Polyolefin coating shall be 10-mils (0.254 mm). Color to match fabric (black) per ASTM F934.Touch up hinges, latches, drop rods and other moveable parts with a liquid polymer touch up product as needed

B. Gateposts: Regular Grade ASTM F1083 Schedule 40 pipe

Gate fabric height up to and including 6 ft. (1.2m)		
Gate Leaf Width	**Post Outside Diameter**	**Weight**
up to 4 ft. (1.2 m)	2.375 in. (60.3 mm)	3.65 lb/ft (5.4 kg/m)
over 4 ft. to 10 ft. (1.2 to 3.05 m)	2.875 in. (73.0 mm)	5.79 lb/ft (8.6 kg/m)
over 10 ft. to 18 ft.(3.05 to 5.5 m)	4.000 in. (101.6 mm)	9.11 lb/ft (13.6 kg/m)
Gate fabric height over 6 ft. to 12 ft. (1.2 to 2.4m)		
Gate Leaf Width	**Post Outside Diameter**	**Weight**
up to 6 ft. (1.8 m)	2.875 in. (73.0 mm)	5.79 lb/ft (8.6 kg/m)
over 6 ft. to 12 ft. (1.8 to 3.7 m)	4.000 in. (101.6 mm)	9.11 lb/ft (13.6 kg/m)
over 12 ft. to 18 ft. (2.4 to 5.5 m)	6.625 in. (168.3 mm)	18.97 lb/ft (28.2 kg/m)
over 18 ft. to 24 ft. (5.5 to 7.3 m)	8.625 in. (219.1 mm)	28.58 lb/ft (42.5 kg/m)

2.11 CONCRETE

A. Concrete for post footings shall have a 28-day compressive strength of 3,000 psi. (20.6 MPa).

PART 3 EXECUTION

3.1 CLEARING FENCE LINE

Clearing: Surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence is to be included in the in the bid prices for **Item 2 (Construction Survey & As-Built Survey), Item 4 (Clearing, Grubbing and Hauling) and Item 5 (Demolition and Hauling).**

3.2 FRAMEWORK INSTALLATION

A. Posts: Posts shall be set plumb in concrete footings in accordance with ASTM F567. Minimum footing depth, 36 in. (609.6 mm) plus an additional 6 in. (76.2 mm) depth for each 1 ft. (305 mm) increase in the fence height over 4 ft. (1220 mm). Minimum footing diameter 8 in. and three times the largest cross section of post greater than a 4.00” (101.6 mm) dimension. Top of concrete footing to be 6 inches (152 mm) below grade**.** Line posts installed at intervals not exceeding 10 ft. (3.05 m) on center.

B. Top rail: When specified, install 21 ft. (6.4 m) lengths of rail continuous thru the line post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. (152 mm) long. Rail shall be secured to the terminal post by a brace band and rail end. Bottom rail or intermediate rail shall be field cut and secured to the line posts using boulevard clamps or brace band with rail end. Place mid-rail for baseball field backstop at locations noted in the construction plans.

C. Terminal posts: End, corner, pull and gate posts shall be braced and trussed for fence 6 ft. (1.8 m) and higher and for fences 5 ft. (1.5 m) in height not having a top rail. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.

D. Tension wire: Shall be installed 4 in. (101.6 mm) up from the bottom of the fabric. Fences without top rail shall have a tension wire installed 4 in. (101.6 mm) down from the top of the fabric. Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band. Secure the tension wire to each line post with a tie wire.

3.3 CHAIN LINK FABRIC INSTALLATION

Chain Link Fabric: Install fabric to outside of the framework maintaining a ground clearance of no more than 2 inches (50 mm). Attach fabric to the terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post with tension bands and 5/16 in. (7.94 mm) carriage bolts spaced no greater than 12 inches (304.8mm) on center. Small mesh fabric less than 1 in. (25 mm), attach to terminal post by sandwiching the mesh between the post and a vertical 2 in. wide (50mm) by 3/16 in. (4.76 mm) galvanized steel strap using carriage bolts, bolted thru the bar, mesh and post spaced 15 in. (381 mm) on center. Chain link fabric to be stretched taut free of sag. Fabric to be secured to the line post with tie wires spaced no greater than 12 inches (304.8 mm) on center and to horizontal rail spaced no greater than18 inches (457.2 mm) on center. Aluminum alloy tie wire shall be installed following ASTM F567: Wrap the tie around the post or rail and attached to a fabric wire picket on each side of the post or rail by twisting the tie wire around the fabric wire picket two full turns, cut off excess wire and bend over to prevent injury. Preformed 9 gauge power-fastened wire ties shall be installed following ASTM F567: Wrap the tie a full 360° around the post or rail and fabric wire picket, using a variable speed drill, twist the two ends together three full turns, cut off any excess wire and bend over to prevent injury. Secure the fabric to the tension wire by crimping hogs rings around a fabric wire picket and tension wire.

3.5 GATE INSTALLATION

A. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F 567. Direction of swing shall be as depicted on construction plans. Gates shall be plumb in the closed position having a bottom clearance of 3 in. (76 mm), grade permitting. Hinge and latch offset opening space shall be no greater than 3 in. (76 mm) in the closed position. Double gate drop bar receivers shall be set in a concrete footing minimum 6 in. (152 mm) diameter 24 in. (609.6 mm) deep. Gate leaf holdbacks shall be installed for all double gates.

3.7 NUTS AND BOLTS

Bolts: Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.

3.8 ELECTRICAL GROUNDING

Grounding: Grounding of the fence and gates is not the responsibility of the fence contractor and not included in the fencing scope of work for this contract. A licensed electrical contractor shall install grounding when required.

3.9 CLEAN UP

Clean Up: The area of the fence line shall be left neat and free of any debris caused by the installation of the fence.

END OF SECTION 32 31 13

Item 43 **Shower Tower, Shower Pad and Plumbing:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to construct the splash park shower tower, shower pad and deck drain, and connect these to the new potable water supply and sanitary sewer services, as indicated in the plans.

The CONTRACTOR must submit shop drawings detailing the shower tower, the drain and the water supply and drain connections. The CONTRACTOR is responsible for ensuring that the connections are in compliance with all applicable sections of the Florida Building Code (Latest Edition), City of Port Orange standards and specifications, and Florida Department of Health regulations. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Shower, Shower Pad and Plumbing** is LUMP SUM.

Item 44 **Playground Equipment and Soft Surfacing:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to install Playground Equipment and construct Playground Soft Surfacing as indicated in the construction plans. For playground equipment, the CONTRACTOR shall furnish the following items –

A. Gametime® Choo Choo Trestles Powerscape Playground Adapted with ADA Ramp and Additional Elements; Atlantic Color Palette.
B. Gametime® ADA Primetime Swing with Two (2) Belt Seats, Two (2) Enclosed Tot Seats, One (1) Expression Swing and One (1) Adaptive Swing; Atlantic Color Palette.
C. Equal products for (A) and (B) from an alternate manufacturer, with the approval of the ENGINEER and the CITY.

For Playground Soft Surfacing, the CONTRACTOR shall provide Gametime® Poured in Place Safety Surface, Tan color, or an equal product approved by the ENGINEER. The CONTRACTOR shall coordinate with the product MANUFACTURER(S) to determine the required thickness of the protective rubber play surface, and shall submit documentation detailing the required thickness to

the ENGINEER for approval. The CONTRACTOR must submit shop drawings, installation instructions, data sheets and other relevant product information on selected playground equipment and soft surface products to the ENGINEER for approval, prior to ordering or installing any materials or components. Installation of products shall be per the MANUFACTURER's instructions and requirements. Site preparation shall be per the MANUFACTURER's instructions and requirements, and any results of compaction, concrete or other required testing of the prepared site shall be submitted to the ENGINEER for approval. Any products or materials manufactured, purchased or installed without the approval noted above shall be replaced at the CONTRACTOR's expense. All materials and construction methods shall be per the soft surfacing MANUFACTURER's requirements.

The basis of payment for **Playground** is LUMP SUM.

Item 45 **Playground Fencing:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct 4 ft. height, black polymer coated chain link fencing with a swing access gate at the playground as noted on the construction plans. Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for fencing specifications.

The CONTRACTOR shall submit shop drawings and cut sheets for all fencing components and hardware prior to ordering or installing fencing. Any fencing installed without approval shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Playground Fencing** is LUMP SUM.

Item 46 **Playground Shade Structure:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials, and hardware needed to construct one (1) 40' x 45' Mega Span ® shade structure by Shade Systems, Inc. at the playground as per the construction plans. An approved equal product may be substituted with approval from the ENGINEER and the CITY.

The post color shall be Alpine White, and the canopy shall be Canary Yellow Coolnet®. Site preparation and installation shall be per the MANUFACTURER's instructions and specifications; any required testing of soils or concrete at the installation site shall be included in the bid price, and all testing results shall be submitted to the ENGINEER for approval. The CONTRACTOR shall submit shop drawings, technical data sheets and installation instructions to the ENGINEER for approval prior to ordering or installing structures. All warranty documents shall be submitted to the CITY at project closeout. Any shade structure components installed without the required approvals shall be replaced by the CONTRACTOR at no additional cost to the CITY.

The basis of payment for **Playground Shade Structure** is LUMP SUM.

Item 47 **Skatepark:**

The bid price for this item shall include, but not be limited to, the necessary

manpower, equipment, materials, and hardware needed to construct the Skatepark as indicated in the plans. This also includes all compaction, foundation, surfacing, furnishing and features, etc. to complete the Skatepark per plans.

The CONTRACTOR must submit shop drawings detailing the surfaces, finishes, concrete mixes, required soil and compaction testing, drainage structures, prefabricated or manufactured park features, etc. to the ENGINEER for approval prior to ordering, placing, installing or constructing these items. Any products or materials purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Splashpark** is LUMP SUM.

01 00 00 SPECIALTY SKATEPARK CONSTRUCTION AND REQUIRED CONTRACTOR EXPERIENCE

01 11 00 SUMMARY OF WORK

01 71 00 WARRANTY

DIVISION 2 – EXISTING CONDITIONS

02 40 00 SITE DEMOLITION

DIVISION 3 – CONCRETE

03 10 00 CONCRETE FORMWORK

03 20 00 CONCRETE REINFORCEMENT

03 30 00 CAST-IN-PLACE CONCRETE

03 30 53 COLORED CAST-IN-PLACE CONCRETE

03 37 13 SHOTCRETE

03 39 00 CONCRETE CURING

DIVISION 5 – METALS

05 50 00 METAL FABRICATIONS

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07 92 00 JOINT SEALING

DIVISION 9 – FINISHES

09 90 00 PAINTING

DIVISION 31 – EARTHWORKS

31 23 13 SUB-GRADE PREPARATION

DIVISION 33 – UTILITIES

33 40 00 STORM DRAINAGE

SECTION 01 00 00 SPECIALTY SKATEPARK CONSTRUCTION AND REQUIRED CONTRACTOR EXPERIENCE

1.0 SPECIALTY SKATEPARK CONSTRUCTION

A. All work contained in this Project is considered specialty skatepark construction. Only those firms that meet the minimum experience requirements contained in the QUALITY ASSURANCE Section and have been pre-qualified may perform this work as specified herein.

2.0 REQUIRED CONTRACTOR EXPERIENCE

A. Contractor Experience: Bidding contractors must provide evidence to indicate successful experience in providing cast-in-place concrete work for skate parks similar in scope to that specified herein and must demonstrate successful experience through past project documentation and references.

1. Required Experience: Contractor or bidding contractor's team inclusive of named sub-contractors must have completed (5) public concrete skate park facilities with a minimum size of 7,000 square feet. Such skate parks facilities must be open and in good operating condition for at least one year to qualify as completed skate park facilities for purposes of counting towards the required experience. Only those skate park facilities projects where the complete construction of the facility has been the sole responsibility of the bidding contractor (or bidding contractor's team inclusive of named sub-contractor) firm will be considered acceptable projects to evidence credible experience.

2. Evidence of Experience: Contractor shall submit to the City satisfactory documentation of the aforementioned experience and qualification. If a Contractor cannot provide this information or if it is unverifiable, work under this Section and any other related Section cannot be completed by Contractor.
This submission must contain the Project Name & Location, Owner's Name & Contact Information, Architect Name & Contact Information, Project Size, Contract Value, Completion Date, and Supervisor and/or Key Personnel (included relevant and specific subcontractor information as applicable) responsible for this experience for each of the qualifying projects.

END OF SECTION

SECTION 01 11 00 SUMMARY OF WORK

Part 1 General

1.1 DESCRIPTION OF WORK

1. The tender includes but is not limited to construction of the following:

A. Supply and installation of all components necessary to construct a concrete skateboard / youth park including site preparation, earthworks, site servicing and drainage, fine grading, metal work, concrete walls,

concrete slabs, concrete transition and bank elements and related landscape works – as per contract documents.

B. This park includes specialty concrete work and careful attention to detail. Refer to Concrete specification 03 30 00 for additional performance expectations for workmanship, quality, and contractor qualifications.

1.2 GUARANTEE

1. All workmanship and material is to be guaranteed for a period of 1 year from the date of completion of the contract as indicated in Section 01710.

2. All Work must be performed to the satisfaction of the Owner within the guarantee periods.

1.3 COORDINATION OF THE WORK

1. The CONTRACTOR shall be responsible for the coordination of the various portions of the Work in order that the combined Work will produce the desired result without delay.

1.4 SETTING OUT THE WORK

1. The CONTRACTOR shall be responsible for all setting out and leveling required for the project.

2. In setting out, include the preparation of grade sheets, installation of grade stakes, offsets, site rails and similar operations.

3. The CONTRACTOR shall be responsible for the correctness of the position, levels, dimensions and alignment of the Work, and for the provision of necessary instruments and labour in connection therewith. Checking of the setting out of line or level by the Owner does not relieve the CONTRACTOR of his responsibility for the correctness thereof.

4. Carefully protect and preserve stakes, lot pins, marks and reference points, and replace if destroyed or removed.

5. Wherever necessary suspend Work temporarily to permit the Consultant and/or Owner to inspect and check the line and grade of any portion of the Work.

1.5 PROTECTION

1. The CONTRACTOR will be responsible for protecting the Work in each area, until Work in that area has been completed, fully cured, and set; also for protecting other surfaces during execution of Work in accordance with the General Specifications.

2. Should the Work be closed down for any cause whatsoever, the CONTRACTOR shall assume all responsibility for its proper protection during such a period. He shall make suitable arrangements for protection of any of the Work liable to damage.

1.7 USE OF PREMISES

1. The CONTRACTOR shall confine apparatus, the storage of materials and the operations of workers to limits indicated by laws, ordinances, permits or by direction of the Owner, and shall not unreasonably encumber the site with his materials. The CONTRACTOR shall not load or permit to be loaded any part of the Work with a weight that will endanger its safety. The CONTRACTOR shall enforce instructions regarding signs, advertisements, and fires.

2. Confine activities relevant to the Work to immediate areas. No fires, explosions or similar dangerous activities be permitted on Owner's property without Owner's permission.

1.8 WATCHING

1. The CONTRACTOR shall be responsible for watching the site at all times and the making good of all deficiencies at no extra to the Contract sum. No security will be provided or compensation paid by the Owner for material or Work stolen, lost, damaged or destroyed.

1.9 EXISTING SERVICES

1. It is the responsibility of the CONTRACTORs to satisfy themselves by examination of the site of the Work and existing conditions and materials which may be encountered on the site. It is the responsibility of the successful CONTRACTOR to notify all agencies regarding the installation of any services in this contract and to obtain stakeouts and permits for the services.

1.10 DELIVERY AND STORAGE

1. Materials shall be handled and stored on the job in such a manner that no damage shall be done to the material. An area of the site shall be allocated by the Contractor for the storage of materials brought to the job by all Sub-contractors except materials to be stored under cover. The storage area shall be kept tidy at all times and no other part of the property shall be used.

2. Materials shall be protected from damage during handling, storage and installation.

1.11 OTHER CONTRACTS

1. Contracts arranged for the Owner, for other types of Work may be in progress by more than one Contractor.

2. The CONTRACTOR must make early arrangements and be prepared with persons and materials to fully cooperate with the Contractor(s) of adjoining Work.

1.12 PERMITS

1. The CONTRACTOR shall be responsible for obtaining and paying for any permits required for the performance of the Work unless provided by the city.

2. The CONTRACTOR shall obtain and pay for all permits (unless provided by the city) and licenses, but not permanent easements, and shall give all notices, pay

all fees, and comply with all laws, ordinances, rules and regulations bearing on the Work. If the CONTRACTOR observes that drawings and specifications are at variance therewith, he shall promptly notify the Consultant and Owner in writing. If the CONTRACTOR performs any Work knowing it to be contrary to such laws, ordinances, rules or regulations, and without such notice to the Owner and Consultant, he shall bear all costs arising from same.

1.13 HOUSEKEEPING

1. The CONTRACTOR shall be responsible for maintaining the Work in a neat, clean and workmanlike manner at all times and for regular clean-up of the Work to the satisfaction of the Owner.

2. Keep public streets, internal roads and other construction areas clean and free from mud. If it is necessary to haul wet material, use suitable watertight trucks. Clean up any internal or public roads as required and or when directed by the Owner.

3. Control dust by the use of water.

1.14 STARTUP MEETING

1. After the tender has been awarded, a meeting will be arranged between the CONTRACTOR and the Consultant to review construction methods and schedules. This meeting may be waived at the discretion of the Consultant or the Owner.

1.15 CLEANUP

1. The CONTRACTOR shall dispose of all rubbish and surplus materials and leave the site in a neat and presentable condition, prior to Substantial Performance.

1.16 REINSTATEMENT

1. The CONTRACTOR shall be responsible for the reinstatement and repair of all items damaged as a result of the Work. These include, but are not limited to, curbs, municipal sidewalks, and boulevards. Such repairs must be completed prior to Substantial Performance.

1.17 FINAL INSPECTION

1. Notify the Consultant when, in the CONTRACTOR's opinion, the Work has been substantially performed.

1. The Consultant will arrange a final inspection of the site between the CONTRACTOR and the City.

SECTION 01 71 00 WARRANTY

Part 1 General

1.1 OVERVIEW

1. The warranty for this skatepark is one (1) year from final completion as documented by the contract administrator.

2. The warranty information is related to correction of defects and does not cover damage caused by park usage.

3. The procedures for correcting a structural deficiency shall be subject to contract administrator approval.

1.2 DAMAGE FROM BMX USE

1. This facility may be used by BMX bikes. Details associated with steel edging and metal plates are intended to protect against heavy wear from bike use.

2. CONTRACTOR must ensure that the metal specifications for rails and steel edging is properly adhered to as some 'dimpling' of the steel can be caused by lesser gauges.

1.3 CONCRETE CRACKING

1. Because of complex shaping, and extensive use of concrete, some cracking is expected to occur.

2. Cracking considered 'structural' in nature will be covered by the CONTRACTOR's warranty.

3. Cracking caused by 'shrinkage' or quick curing will not be considered a warranty issue provided that the CONTRACTOR takes reasonable measures to prevent such aesthetic cracks.

    1. i.e. wet curing concrete, pouring in reasonable temperature situations, use of cure and seal products, etc.

1.4 GUARANTEES AND WARRANTIES

1. The Warranty period shall extend for a period of one (1) year from final performance of the work.

2. The warranty shall cover construction workmanship and structural elements. Damage caused by park use, graffiti removal, or maintenance is not covered by the CONTRACTOR's warranty.

3. All manufacturer warranties for supplementary equipment and site furnishings shall be submitted to the Owner upon completion of the work.

END OF SECTION 01 71 00

DIVISION 2 – EXISTING CONDITIONS

SECTION 02 40 00 SITE DEMOLITION

PART 1 General

1.1 GENERAL CONDITIONS

1. A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to perform all site demolition work as indicated on the Drawings complete as shown and as specified herein.

B. Related Work:
   1. Section 31 23 13 – Sub-grade Preparation (Skate Park)
   2. Section 31 00 00 – Earthwork (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner.

B. Comply with the current provisions of the following Codes and Standards:
   1. ASTM - American Society for Testing and Materials.
   2. Standard Specifications – Agency Specified
   3. Uniform Building Code

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Demolish existing site improvements as indicated on the Drawings, in an orderly and careful manner. Comply with all local codes and ordinances.

B. Equipment: Use equipment specifically designed for the demolition of each type of material.

C. Labor: Employ workmen skilled in the use of the equipment being utilized for demolition.

1.5 DELIVERY, STORAGE, AND DISPOSAL

A. Delivery and Storage: Do not deliver to the job site nor store thereon demolition equipment and materials prior to receiving written notice to proceed. Confine storage to areas approved by the Owner.

B. Disposal: Legally dispose of offsite products of demolition. CONTRACTOR shall pay all disposal costs associated with the project.

1.6 PROJECT CONDITIONS

A. Existing Conditions: Inspect site prior to commencing work. Determine scope of applicable site conditions.

B. Access and Testing: Refer to Geo-Technical Report available upon request from the ENGINEER. As required, supplement available information with test pit excavations and borings required to determine existing sub-surface conditions, subject to Owner's convenience.

C. Acceptance: Commencing work constitutes CONTRACTOR's acceptance of site conditions, both surface and subsurface. No extra payment shall accrue to CONTRACTOR by virtue of unknown conditions or difficulties of performing this demolition work.

1.7 PROTECTION

A. Protection of Existing Plants to Remain

1. Operations: Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain except as actually required for construction in those areas.

2. Barriers: Provide barricades, fences or other barriers as necessary at the drip line to protect existing plants to remain from damage during construction.

3. Notification: Notify ENGINEER when CONTRACTOR feels construction activities may damage existing plants to remain.

4. Replacement of Damaged Plants:

   a. Replace existing plants to remain that are damaged during construction with accepted plants of the same species and size as those damaged at no cost to Owner.

   b. ENGINEER will determine extent of damage and value of damaged plants.

B. Protection of Existing Site Improvements

1. References: Verify and maintain benchmarks, monuments and other reference points. Replace if disturbed or destroyed.

2. Protection: Protect existing improvements noted to remain within designated limit(s) of work. Supply shoring, bracing, reinforcing and barricades as required. Refer to drawings for limit of work.

3. Utilities: Keep in operation existing utility circuits and piping to remain including sprinkler irrigation except at the direction of the ENGINEER. Provide 48-hour notice of interruption of service. Notify ENGINEER should utilities not shown on Drawings be found during demolition.

4. Repair: If damage to site improvements to remain occurs during the course of the work, restore to the satisfaction of the Owner at no additional cost.

PART 2 – (Not Applicable)

PART 3 Execution

3.1 PREPARATION

A. Verification: Verify with Owner items to be removed prior to commencement of work.

B. Compliance: Proceed with demolition in an orderly and careful manner, in compliance with local codes and ordinances.

C. Disposal: Legally dispose of demolished materials off site unless otherwise directed by Owner.

3.2 DEMOLITION

A. Utilities:
1. Capping: Disconnecting and capping of utilities must be in accordance with the regulations of the utility company affected.

B. Paving and Walls:
1. Sawcutting: Accurately and cleanly sawcut existing concrete paving as shown on Drawings. Confine cuts to areas shown. Avoid damage to adjacent improvements.

2. Finishing: Rough grade excavated areas as necessary to achieve the final line and grade as called for in other Sections of this work. Compact the grade to the density of the surrounding area. The final surface shall be smooth, even and tight, free from loose or soft areas.

C. Subgrade: Fill depressions made by demolition and restore excavated areas to a smooth and even grade. Compact the grade to the density of the surrounding soil and per the project's soil report.

3.3 DE-WATERING

A. General: Provide and operate equipment and do ditching and pumping necessary to keep the project area free from water.

B. Storm Water: Pump off storm runoff or other water until such time as new work in other Sections shall effectively remove such water.

C. Protection: Take measures required to dispose of surface and subsurface water in compliance with municipal requirements.

B. Debris: Prevent transport of soil, aggregate or debris off site where practical.

END OF SECTION 02 40 00
DIVISION 3 – CONCRETE

SECTION 03 10 00 CONCRETE FORMWORK

PART 1 - GENERAL

SPECIALTY SKATE PARK CONSTRUCTION

All work contained in this Section is considered specialty skatepark construction. Only those firms that meet the minimum experience requirements contained in the QUALITY ASSURANCE Section and have been pre-qualified may perform this work as specified herein.

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to install all concrete formwork related to the skate park as indicated on the Drawings complete as shown and as specified herein.

B. Provide all formwork and accessories for construction of Portland Cement Concrete paving for the skatepark.

C. Related Work:
   1. Section 03 20 00 – Concrete Reinforcement (Skate Park)
   2. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
   3. Section 03 37 13 – Shotcrete (Skate Park)

1.3 REFERENCES

C. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner.

D. Comply with the current provisions of the following Codes and Standards:
   1. ASTM – American Society for Testing and Materials.
   2. UBC – Uniform Building Code.
   3. ACI – American Concrete Institute.
   4. Standard Specifications (as specified in the General Provisions).

1.4 QUALITY ASSURANCE

A. Design Criteria: Conform to ACI 347-68, Chapter I.

B. Allowable Tolerances: Conform to ACI 347-68, 2.4.

1.5 STORAGE OF MATERIALS

A. Store materials on and under protective sheeting.

1.6 COORDINATION

A. Notify responsible trades of schedules of concrete pours to allow time for installation and coordination.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Forms:

1. Flatwork and Bond Beam: 1” Exterior Masonite Siding for all Tangents. 7/16” Exterior Masonite Siding for all radii. Create true arc to tangent connections as per layout plan. No kinks will be accepted.

2. Vertical and Custom Work: Exterior grade Standard Douglas Fir (or equal plywood), minimum three ply, one smooth side sufficiently thick to sustain loads, or steel forms.

B. Form Oil: Non staining, paraffin-base oil having a specific gravity of between 0.8 and 0.9.

C. Form Ties: Bolts, rods, or patented devices having tensile strength of 3000 lbs., adjustable length, free of lugs which would leave a hole larger than 5/8" diameter and having a full one-inch depth of break-back.

PART 3 - EXECUTION

3.1 CONSTRUCTION AND ERECTION

A. Construct forms in accordance with ACI 347-68.

B. Build forms to shapes, lines and dimensions of detailed members of concrete construction. Set to line and grade, brace and secure to withstand placing of concrete and maintain their shape and position.

C. Construct forms with care to produce concrete surfaces without unsightly or objectionable form marks in exposed concrete surfaces.

D. Thoroughly clean surfaces of form material and remove nails before reuse. Do not reuse damaged or worn forms. Coat contact surfaces of forms with non-staining form oil prior to placing metal reinforcement.

E. Immediately before placing concrete, clean forms of chips, sawdust, and debris. Immediately after removal of forms, remove form ties, wires, and defects and patch.

3.2 INSERTS AND ACCESSORIES

A. Make provisions for required installation of accessories, bolts, hangers, sleeves, anchor slots and inserts cast in concrete. Obtain suitable templates or instructions for installation of items. Place expansion joints where detailed and required.

3.3 REMOVAL OF FORMS AND SHORING

A. Remove forms and shores in accordance with ACI 347-68.

3.4 CLEANUP

A. Upon completion of the concrete formwork, remove surplus construction materials, loose earth, trash and debris so that the job site is left in a neat and orderly condition.

END OF SECTION 03 10 00

SECTION 03 20 00CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to install all concrete reinforcement related to the skate park as indicated on the Drawings complete as shown and as specified herein.

B. Provide all steel reinforcement for construction of Portland Cement Concrete paving for the skate park.

C. Related Work:
1. Section 03 20 00 – Concrete Reinforcement (Skate Park)
2. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
3. Section 03 37 13 – Shotcrete (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner.
B. Comply with the current provisions of the following Codes and Standards:
1. ASTM - American Society for Testing and Materials.
2. Standard Specifications – Agency Specified
3. Uniform Building Code
C. American Concrete Institute (ACI):

1. ACI 315-80, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
2. ACI 318-77, Building Code Requirements for Reinforced Concrete.

D. American Society for Testing and Materials (ASTM - latest editions):

1. ASTM A233 - Mild Steel Arc Welding Electrodes.
2. ASTM A615 - Deformed Billet-Steel Bars for Concrete Reinforcement.
3. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
4. ASTM F2480 – Standard Guide for In-ground Concrete Skate Park.

E. Concrete Reinforcing Steel Institute (CRSI): Manual of Standard Practice, latest edition.

F. American Welding Society (AWS): Reinforcing Steel Welding Code, D12.1-75, including latest revisions.

1.4 DELIVERY AND STORAGE

A. Store materials in dry and protected locations and protect from damage. Stack reinforcing steel in staggered tiers. Mark each length, size, shape and location. Maintain reinforcement free of dirt, mud, paint or rust.

1.5 SUBMITTALS

A. In accordance with the Contract Documents, General, Special and Technical Provisions.

B. Shop Drawings: Indicate complete reinforcing method for each concrete member including materials, sizes, bends, dimensions, stirrup spacing, and placing details not shown on drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Reinforcement: Conforming to ASTM A615, Grade 60, clean and free of rust, dirt, grease or oils.

B. Welded Steel Reinforcement: Deformed low-alloy steel, ASTM A706, carbon content not exceeding 0.30% and manganese content not exceeding 0.60%. Identify and tag with manufacturer's heat identification number.

C. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place.

2.2 FABRICATION

A. Fabricate to sizes, shapes, and lengths detailed in accordance with requirements of ACI 318-71 and ACI 315-65.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Concrete Reinforcing Steel Institute’s recommended practice for “Placing Reinforcing Bars” for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover over reinforcement.

D. Accurately place reinforcing steel in accordance with drawings. Thoroughly clean reinforcement of any coating which would reduce bonding. Do not heat, cut, or bend bars without ENGINEER's approval. Do not splice reinforcement at points of maximum

stress. Stagger splices in adjacent bars and provide a minimum overlap of 30-bar diameters at splices unless specifically noted otherwise on Drawings.

C. Securely saddle tie intersections with No. 18 gauge black annealed wire. Rigidly secure reinforcement in place. Provide concrete coverage as shown on Drawings.

3.2 WELDING REINFORCEMENT

A. Weld deformed steel reinforcement bars in strict accordance with AWS 12.1, using recommended pre-heat temperature and electrode for type of steel being welded.

B. Do not weld steel reinforcement bars without proper heat identification of bars.

3.3 CLEANUP

A. Upon completion of the concrete reinforcement work, remove surplus construction materials, loose earth, trash and debris so that the job site is left in a neat and orderly condition.

END OF SECTION 03 20 00

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.0 SPECIALTY SKATE PARK CONSTRUCTION

A. All work contained in this Section is considered specialty skatepark construction. Only those firms that meet the minimum experience requirements contained in the QUALITY ASSURANCE Section and have been pre-qualified may perform this work as specified herein.

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

D. Furnish materials, labor, transportation, services, and equipment necessary to install all Portland Cement Cast-In-Place Concrete related to the skatepark as indicated on the Drawings complete as shown and as specified herein.

E. Related Work:
1. Section 03 10 00 – Concrete Formwork (Skate Park)
2. Section 03 20 00 – Concrete Reinforcement (Skate Park)
3. Section 03 37 13 – Shotcrete (Skate Park)
4. Section 03 39 00 – Concrete Curing (Skate Park)

1.3 REFERENCES

C. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the owner. Comply with the current provisions of the following Codes and Standards:

D. ASTM - American Society for Testing and Materials:
   1. ASTM C33 – Concrete Aggregates.
   2. ASTM C94 – Ready-Mixed Concrete.
   3. ASTM C143 – Test for Slump of Portland Cement Concrete.
   4. ASTM C150 – Portland Cement.
   5. ASTM C260 – Air-Entraining Admixtures for Concrete.
   6. ASTM C494 – Chemical Admixtures for Concrete.
   7. ASTM C618 – Fly Ash and Raw or Calcined Natural Pozzalans for Use in Portland Cement Concrete
   8. ASTM F2480 – Standard Guide for In-ground Concrete Skate Park.

E. ACI – American Concrete Institute:
   1. ACI 211.1-81 – Recommended Practice for Selecting Proportions for Normal-Weight Concrete.
   2. ACI 211.3-81 – Recommended Practice for Selecting Proportions for Lightweight Concrete.
   3. ACI 301 – Specifications for Structural Concrete for Buildings.
   4. ACI 305 – Recommended Practice for Hot Weather Concreting.
   5. ACI 306 – Recommended Practice for Cold Weather Concreting.
   6. ACI 318 – Building Code Requirements for Reinforced Concrete.

F. UBC – Uniform Building Code

G. AWS – American Welding Society
   1. AWS 3.0-41 – Standard Qualifications Procedure.
   2. AWS D1.4 – Structural Welding Code – Reinforcement.
   3. AWS D12.1-61 – Reinforced Concrete Construction.

H. CRSI – Concrete Reinforcing Steel Institute: MSP-1 – Manual of Standard Practice

1.4 SUBMITTALS

A. Design of Concrete Mixes:
   1. CONTRACTOR shall be responsible for design of concrete mixes. Design of concrete mixes shall be reviewed by the proposed material supplier to confirm their ability to produce the mix and reviewed by the project Testing Laboratory selected by CONTRACTOR and approved by the Owner.
   2. Design methods to be in accordance with ACI 318-71.
   3. Mix Design Submittals must include actual aggregate supply proposed for the work.
   4. Check mix design and revise, if necessary, wherever changes are made in aggregate or in surface water content of aggregate or workability of concrete. Slump shall be the minimum to produce workable mix. Laboratory shall prescribe minimum quantity of water.
   5. If Portland Cement reducers or other additives are used, submit control mix design without reducers or additives as well as mix exactly proposed to be used. Submit W.R. Grace Co. recommendations for retarder and shrinkage compensation of slab on grade.
   6. Forward two copies of design mix to ENGINEER for approval.

B. Submit product data and manufacturer's instructions for:
   1. Color admixture.

2. Expansion joint fill material.
3. Curing compound.
4. Dowel aligners/caps.
5. Waterstop.
6. Crack repair materials.
7. Form facing materials.
8. Form release agents.
9. Proprietary cleaning agents.
10. Plastic film for curing.
11. Surface retarders.

C. Samples:
   1. Samples for Color Selection: Submit color additive manufacturer's color chart & sample chip set; indicate color additive number and required dosage rate. Samples indicate general color and may vary from concrete finished in field according to Specifications.
   2. Expansion Joint Fill Material: Submit one 12-inch length.

D. Delivery Documentation: Batch tags for each load of concrete, for information and documentation purposes.

1.5 QUALITY ASSURANCE

B. Pre-Bid Conference (if applicable): Prior to submitting bid, attend pre-bid conference with ENGINEER to review quality assurance and pre-qualification requirements.

C. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.

D. Sample Pavement Panels:
   1. CONTRACTOR shall prepare Sample Pavement Panels for each paving type indicated on Drawings including aggregates, texture, color, and finishes.
   2. Sample Pavement Panels shall be completed to the satisfaction of the Owner, and Owner Representative.
   3. The approved Sample Pavement Panels will become the standard of quality by which future paving samples and work will be judged.
   4. The Sample Pavement Panels may be part of the completed Work and must be protected during the course of construction, as a means to compare work in progress. If Sample Pavement Panels are damaged or removed, CONTRACTOR shall repair/replace in-kind immediately.

E. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

F. Safety and Performance Guidelines: Comply with all safety and performance requirements and all applicable references as specified in the ASTM F2480 Standard Guide for In-ground Skate Parks.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials in dry and protected locations and protect from damage.

B. Do not change brand of cement or source of aggregate during course of Work.

1.7 SITE CONDITIONS

A. Environmental Requirements:
   1. Submit plan to monitor wind velocity, relative humidity, temperature, and concrete temperature in order to maintain specified maximum rate of evaporation.
   2. Do not place concrete when sub base surface temperature is less than 40 degrees F, nor when surface is wet.
   3. Protect concrete against extreme cold and heat, frost, rapid drying, and damage by rain.

B. Coordination:
   1. Coordinate schedules of concrete placement to allow adequate time for installation of other related work.
   2. Verify that anchor bolts and other embedded steel items to be cast into concrete are properly placed.
   3. Coordinate size and location of mechanical and electrical equipment concrete pads.
   4. Coordinate earthwork and soils report requirements with placement requirements.
   5. Coordinate with form-work and finishes sections to provide finish floor levelness and flatness as specified herein. Slope to drains at grades and percent slope shown on contract documents.
   6. Ensure that irrigation sleeves, electrical conduit, drainage lines and other utility elements are accommodated and as-built located prior to placing concrete.

1.8 WARRANTY

A. General Description: In addition to manufacturer's warranties, warrant Work for a period of one year from the Date of Final Completion against defects in materials and workmanship.

B. Additional Items Covered: Warranty shall also cover repair of damage to other materials and workmanship resulting from defects in materials and workmanship.

C. Exceptions: CONTRACTOR shall not be held responsible for failures due to ordinary wear, neglect by Owner, vandalism, or other causes beyond the CONTRACTOR's control.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ready Mixed Concrete: Batched, mixed and transported in accordance with ASTM C 94 – Specifications for Ready Mixed Concrete.

B. Portland Cement: Refer to Drawings for specific paving type and finish required and conform to ASTM C-150, Type II. Use same brand of cement from single source throughout entire project for each paving type.

C. Fine Aggregate (washed concrete sand): Clean, hard, durable, uncoated washed natural sand, free from silt, loam or clay, and conforming to ASTM C 33.

D. Coarse Aggregate: Clean, hard, durable, un-coated coarse aggregate conforming to ASTM C33. Use same coarse aggregate from single source throughout entire project.

E. Water: Potable and free from deleterious materials such as oils, acids, and organic matter.

F. Admixture: Cement-dispersing, water-reducing compound, ASTM C 494, Type A, as made by Master Builders, Sika, or Gifford-Hill Co., or equal. Depending upon weather

conditions at time of placing, ASTM C 494, Type D (water-retarding) or Type E (water-reducing, accelerating) may be used if approved by ENGINEER.

2.2 PROPORTIONS AND MIXING

A. Proportions and Design: In accordance with approved mix design. Minimum allowable compressive strength at 28 days is 3500 psi.

B. Admixture: No admixtures without approval. Introduce admixtures in quantities and according to methods recommended by admixture manufacturer. Add air-entraining agent to concrete as scheduled.

C. Slump: Not to exceed 3 ½”

D. Mixing: Ready mixed concrete in accordance with ASTM C-94. Do not transport or use concrete after 1-1/2 hours have elapsed from time of initial mixing. Supplier of transit-mixed concrete shall have a plant of sufficient capacity, and adequate transportation facilities to assure continuous delivery at required rate, to provide continuous concrete placement throughout a pour.

E. Grout and Dry Pack: Non-Shrink, Non-Metallic: U.S. Grout Corp. “Five Star Grout” ASTM C-877, C-191, and C-109, 5,000 PSI.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect subgrade, forms, reinforcing steel, pipes, conduits, sleeves, hangers, anchors, inserts, and other work required to be built into concrete and report any discrepancies. Notify ENGINEER at least 5 working days in advance of scheduled placement.

B. Correct unsatisfactory work prior to placing concrete.

C. Remove rubbish from formwork immediately prior to placing concrete.

3.2 INSTALLATION

A. Placing Concrete:
   1. Convey and place concrete allowing no separation of ingredients in accordance with ACI 304 and as specified below.
   2. Maximum height of concrete free fall - five feet.
   3. Regulate rate of placement to maintain plasticity and flow into position.
   4. Deposit concrete continuously until panel or section is completed.
   5. Place concrete in horizontal layers 18" maximum thickness.

B. Consolidation:
   1. Use mechanical vibrating equipment for consolidation.
   2. Vertically insert and remove hand-held vibrators at 18" O.C. for 10 to 15 seconds.
   3. Do not use vibrators to transport concrete in forms.
   4. Provide vibrators with minimum speed of 8000 RPM and with amplitude to consolidate effectively.
   5. Thoroughly consolidate concrete and work around reinforcement, embedded items and into corners of forms. Thoroughly consolidate layers of concrete with previous layers.

C. Construction Joints:

1. Unless otherwise shown on Drawings, each footing, wall, beam, and slab shall be considered as a single unit of operation and shall be monolithic in construction.
2. Where construction joints are absolutely unavoidable, locate joints at or near quarter points of spans where approved by ENGINEER and/or shown on plan.
3. Saw Cut joints, Expansion Joints and Key Joints as detailed in contract documents.

D. Expansion Joint Fillers:
   1. Refer to Drawings for Expansion Joint locations and details.
   2. Finish joint material flush with concrete surface.

E. Hot Weather Placement:
   1. Prevent high temperature in fresh concrete during hot weather in accordance with ACI 305.
   2. Use water reducing set retarding admixtures in such quantities as especially recommended by manufacturer to assure that concrete remains workable and lift lines will not be visible.

F. Flatwork:
   1. Cast slabs-on-grade in alternate sections, unless permanent forms are used. Wait 48 hours between all adjacent concrete castings.
   2. Plane Surface Tolerance: Exterior- Class AX, 3/16" in 10' with no ponding.
   3. Maximum 1:500 slope from indicated plane at any point.

G. Finish:
   1. Smooth Trowel finish to match approved Sample Panel finish.
   2. After surface water disappears and floated surfaces have sufficiently hardened, steel trowel then retrowel the surface to a smooth and consistent finish.
   3. After concrete has set enough to provide edge troweling, retrowel edges to a smooth and uniform finish.

H. Cracking:
   1. Cracking from inadequate curing is not allowed. Sawcut joints and construction joints are shown on drawings. CONTRACTOR may, with approval of ENGINEER, recommend and detail other joints required to prevent cracking.

3.3 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, defective, or does not meet the requirements of this Section or conformance with ASTM F 2480 - Standard Guide for In-ground Skate Parks.

B. Protect concrete from damage until Final Completion. Exclude construction traffic from paving for at least 28 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain concrete paving free of stains, discoloration, dirt, wax, and other foreign material until Final Payment.

3.4 CLEAN UP

A. At completion of Work, remove concrete stains from adjacent work, including but not limited to dissimilar paving types, walls, columns, railing posts, light fixtures, plant materials, to satisfaction of ENGINEER.

END OF SECTION 03 30 00

SECTION 03 37 13 SHOTCRETE

PART 1 – GENERAL

1.0 SPECIALTY SKATE PARK CONSTRUCTION

A. All work contained in this Section is considered specialty skate park construction. Only those firms that meet the minimum experience requirements contained in the QUALITY ASSURANCE Section and have been pre-qualified may perform this work as specified herein.

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to install all Shotcrete related to the skate park as indicated on the Drawings complete as shown and as specified herein.

3.

B. Refer to Drawings for specific locations of shotcrete.

C. Related Work:
   5. Section 03 10 00 – Concrete Formwork (Skate Park)
   6. Section 03 20 00 – Concrete Reinforcement (Skate Park)
   7. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
   8. Section 03 39 00 – Concrete Curing (Skate Park)
   9. Section 05 50 00 – Metal Fabrications (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner. Comply with the current provisions of the following Codes and Standards:

B. ASTM - American Society for Testing and Materials:
   1. ASTM C33 – Concrete Aggregates.
   2. ASTM C39 – Test Method of Compressive Strength of Cylindrical Concrete Specimens.
   3. ASTM C94 – Ready-Mixed Concrete.
   4. ASTM C143 – Test for Slump of Portland Cement Concrete.
   5. ASTM C150 – Portland Cement.
   6. ASTM C260 – Air-Entraining Admixtures for Concrete.
   7. ASTM C494 – Chemical Admixtures for Concrete.
   8. ASTM C979 – Pigments for Integrally Colored Concrete.
   9. ASTM C618 – Fly Ash and Raw or Calcined Natural Pozzalans for Use in Portland Cement Concrete.

10. ASTM F2480 – Standard Guide for In-ground Concrete Skate Park.

C. ACI – American Concrete Institute:
   1. ACI 211.1-81 – Recommended Practice for Selecting Proportions for Normal-Weight Concrete.
   2. ACI 211.3-81 – Recommended Practice for Selecting Proportions for Lightweight Concrete.
   3. ACI 301 – Specifications for Structural Concrete for Buildings.
   4. ACI 305 – Recommended Practice for Hot Weather Concreting.
   5. ACI 306 – Recommended Practice for Cold Weather Concreting.
   6. ACI 318 – Building Code Requirements for Reinforced Concrete.

D. UBC – Uniform Building Code

E. AWS – American Welding Society
   1. AWS 3.0-41 – Standard Qualifications Procedure.
   2. AWS D1.4 – Structural Welding Code – Reinforcement.
   3. AWS D12.1-61 – Reinforced Concrete Construction.

F. CRSI – Concrete Reinforcing Steel Institute: MSP-1 – Manual of Standard Practice

1.4 SUBMITTALS

A. Manufacturer's Data: Current printed specifications with application and installation instruction for proprietary materials including concrete admixtures.

B. Shop Drawings: Radial templates cut to exact radii shown on drawings to insure exact radii from flat bottom of skatepark to face of coping. Template shall be fabricated from steel or ¾" Plywood.

C. Design of Concrete Mixes:
   1. CONTRACTOR shall be responsible for design of concrete mixes. Design of concrete mixes shall be reviewed by the proposed material supplier to confirm their ability to produce the mix and reviewed by the project Testing Laboratory selected by CONTRACTOR and approved by the Owner.
   2. Design methods to be in accordance with ACI 318-71.
   3. Mix Design Submittals must include actual aggregate supply proposed for the work.
   4. Check mix design and revise, if necessary, wherever changes are made in aggregate or in surface water content of aggregate or workability of concrete. Slump shall be the minimum to produce workable mix. Laboratory shall prescribe minimum quantity of water.
   5. If Portland Cement reducers or other additives are used, submit control mix design without reducers or additives as well as mix exactly proposed to be used. Submit W.R. Grace Co. recommendations for retarder and shrinkage compensation of slab on grade.
   6. Forward two copies of design mix to ENGINEER for approval.

D. Submit product data and manufacturer's instructions for:
   1. Color admixture.
   2. Expansion joint fill material.
   3. Curing compound.
   4. Dowel aligners/caps.
   5. Waterstop.

6. Crack repair materials.
7. Form facing materials.
8. Form release agents.
9. Proprietary cleaning agents.
10. Plastic film for curing.
11. Surface retarders.

E. Placement Schedule:
   a. CONTRACTOR to indicate on plans the locations to be shot within a day's work and not exceeding 40 cubic yards per day for quality control and inspection schedules.
   b. Schedule and sequence to be reviewed and approved by ENGINEER prior to starting this Work.

F. Test Reports: Compressive strength of concrete test cylinders taken upon delivery of concrete.

G. Delivery Documentation: Batch tags for each load of concrete, for informational purposes.

1.5 QUALITY ASSURANCE

A. Pre-Bid Conference (if applicable): Prior to submitting bid, attend pre-bid conference with ENGINEER to review mock-up requirements and artistic effect desired.

B. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.

C. Sample Shotcrete Panels:
   1. CONTRACTOR shall prepare Sample Pavement Panels for each paving type indicated on Drawings including aggregates, texture, color, and finishes.
   2. Sample Pavement Panels shall be completed to the satisfaction of the Owner, and Owner Representative.
   3. The approved Sample Pavement Panels will become the standard of quality by which future paving samples and work will be judged.
   4. The Sample Pavement Panels may be part of the completed Work and must be protected during the course of construction, as a means to compare work in progress. If Sample Pavement Panels are damaged or removed, CONTRACTOR shall repair/replace in-kind immediately.
   5. Sample Shotcrete Panel must include a panel with the same reinforcement and coping as the highest elevation and largest radii on the project for finish inspection and approval.

D. Concrete Testing:
   1. Prepare test cylinders concurrent with Sample Shotcrete Panels noting the application crew using the equipment, materials and mix design proportions.
   2. A Testing Agency shall test the cylinders in accordance with ASTM C42 and test for compliance with Specifications.

E. Acceptance: Final acceptance of the Sample Shotcrete Panels will be based upon the results obtained from the test cylinders and approval of the shape, form, consistency and finish from the ENGINEER.

F. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

G. Safety and Performance Guidelines: Comply with all safety and performance requirements and all applicable references as specified in the ASTM F2480 Standard Guide for In-ground Skate Parks.

H. ACI Requirements: Meet all requirements of ACI 506, Chapter 13, Wet Method and Chapter 5, Shotcrete Crew.

1.6 DELIVERY, HANDLING, AND STORAGE

A. Properly deliver and handle materials to prevent contamination, segregation or damage to materials.

B. Store cement in weathertight enclosures to protect against dampness and contamination.

C. Prevent segregation and contamination of aggregates by proper arrangement and use of stockpiles.

G. Store admixtures properly to prevent contamination, evaporation, or other damage.

H. Do not change brand of cement or source of aggregate during course of Work.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type I or II, one brand only.

B. Normal Weight Aggregates: ASTM C33 and as herein specified. Aggregate shall comply with gradation No. 2 as shown in ACI 506R Table 2.1. If the CONTRACTOR can show satisfactory performance of an alternate grading under similar conditions of use, the Engineer may waive the requirement for gradation No. 2.

1. Combined gradation of coarse and fine aggregate as follows:

Sieve Size U.S. Standard Square Mesh	Percent by Weight Passing Individual Sieves
3/8 in	90-100
No. 4	70-85
No. 8	50-70
No. 16	35-55
No. 30	20-35
No. 50	8-20
No. 100	2-10

2. Batch fine coarse aggregates separately to avoid segregation.
3. Aggregates shall be free from clay, mud, loam, or other deleterious substances.

4. Dune sand, bank run sand, and manufactured sand are not acceptable for fine aggregate.
5. Coarse aggregate shall be clean, un-coated, heavy media processed aggregate of crushed stone or river washed aggregate.

2.2 ACCESSORIES

A. Water: Fresh, clean, potable, and free of deleterious acids, mixing, and curing water, as available from Owner. Transport as required.

B. Admixtures: Use only accepted admixtures meeting the following requirements:
1. Chemical Admixtures: ASTM C494
2. Water reducing, retarding or accelerating admixtures shall conform to ASTMC.
3. Air-entraining Admixtures: ASTM C1141. Air entraining prior to shooting shall be 7% with a +/- 1-1/2% tolerance.
4. The use of Calcium Chloride shall not be permitted. The CONTRACTOR shall submit details of proposed admixtures with the concrete mix design.
4.

C. Key-Joints: See Cast-In-Place Concrete - Section 03310.

2.3 PROPORTIONING AND DESIGN OF CONCRETE MIXES

A. Mix: Prepare design mix to achieve an in-place 28 day compressive strength of 3,500 pounds per square inch and an air content of 4% at 28 days. Maximum aggregate size shall not exceed 3/8 inch.

B. Test Data: Submit for acceptance proportioning and test data from prior experience if available. If data from prior experience are not available or accepted, make and have tested specimens from three or more different mix proportions in accordance with pre-construction testing requirements of this Specification.

C. Strength: Selected mix proportions on the basis of compressive strength tests of specimens shall be cut from the shotcrete test panels not earlier than 5 days after placing. For mix acceptance purposes, average core strengths shall be least equal to f'c for cores with L/D of 2.0. For cores with L/D between 1.0 and 2.0, use correction factors given in ASTM C42.

D. Review: Mix design shall be reviewed for acceptance by ENGINEER.

2.4 CONCRETE APPLICATION EQUIPMENT

A. For Wet Mix Shotcrete:
1. Mixing Equipment: Capable of thoroughly mixing aggregate, cement and water in sufficient quantity to maintain continuous placement.
2. Ready-mixed Concrete: ASTM C94, except that it may be delivered to the site in the dry state if the equipment is capable of adding the water and mixing it satisfactorily with the dry ingredients.
3. Air Supply: Clean air adequate for maintaining sufficient nozzle velocity for parts of work, and for simultaneous operation of blow pipe for cleaning away rebound.
4. Delivery Equipment: Capable of discharging aggregate-cement-water mixture accurately, uniformly, and continuously through delivery hose.

PART 3 -EXECUTION

3.1 INSPECTION

A. Examination: Examine concrete formwork and verify that it is true to line and dimension, adequately braced against vibration, and constructed to permit escape of air and rebound but to prevent leakage during shotcreting. Correct deficiencies.

B. Inspection: Inspect reinforcement steel and items to be embedded in concrete. Correct any deviations from the accepted shop drawings.

C. Notification: Notify other trades involved in ample time to permit the proper installation of their work. Cooperate in setting such work.

D. Existing Surfaces: Examine existing concrete surfaces for unsound material. Correct deficiencies.

3.2 PREPARATION FOR INSTALLATION OF CONCRETE

A. Forms: Use a form-coating material on removable forms to prevent absorption of moisture and to prevent absorption of moisture and to prevent bond with shotcrete.

3.3 CONCRETE BATCHING AND MIXING

A. Proportions: Mix proportions shall be controlled by weight batching. CONTRACTOR's Testing Laboratory shall maintain quality control records during shotcrete production and make those records available to ENGINEER.

3.4 CONCRETE PLACEMENT

A. Placement: Use suitable delivery equipment and procedures that will result in shotcrete in place meeting the requirements of this Specification. Determine operating procedures for placement in, extended distances, and around any obstructions where placement velocities and mix consistency must be adjusted.

B. Placement Techniques: Do not place shotcrete if drying or stiffening of the mix takes place at any time prior to delivery to the nozzle.

1. Control thickness, method of support, air pressure, and/or water content of shotcrete to preclude sagging or sloughing off. Discontinue shotcreting or provide suitable means to screen the nozzle stream if wind or air currents cause separation of the nozzle stream during placement.

2. Hold nozzle as perpendicular to surface as work will permit, to secure maximum compaction with minimum rebound.

3. In shotcreting walls, begin application at bottom. Ensure work does not sag.

4. Layering:

    a. Build up layers by making several passes of nozzle over work area.

b. Broom or scarify the surface of freshly placed shotcrete to which, after hardening, additional layers of shotcrete are to be bonded. Dampen surface just prior to application of succeeding layers.

c. Allow each layer of shotcrete to take initial set before applying succeeding layers.

d. Use radial templates to insure exact radii from flat bottom of skate park to face of coping. Template shall be fabricated from steel or ¾" Plywood. Check every horizontal foot when applying shotcrete for conformance of intended wall radii. Brace template and place levels at arc to tangent connections to insure no kinks will be formed.

e. Kinks at the bottom of bowls will not be acceptable.

f. Slumping of the shotcrete causing coping setback will not be acceptable.

5. Placement Around Reinforcement:

a. Hold the nozzle at such distance and angle to place materials behind reinforcement before any material is allowed to accumulate on its face. In the dry-mix process, additional water may be added to the mix when encasing reinforcement to facilitate a smooth flow of material behind the bars.

b. Test to ascertain if any void or sand pockets have developed around or behind reinforcement by probing with an awl or other pointed tool after the shotcrete has achieved its initial set, by removal of randomly selected bars, or coring or other suitable standards.

c. Access: Allow easy access to shotcrete surfaces for screening and finishing, to permit uninterrupted application.

3.5 REMOVAL OF SURFACE DEFECTS IN CONCRETE

A. General: Remove and replace shotcrete which lacks uniformity, exhibits segregation honeycombing, or lamination, or which contains any dry patches, slugs, voids, or pockets. Remove defective areas.

B. Sounding: Sound work with hammer for voids. Remove and replace damaged in-place shotcrete.

3.6 CONCRETE FINISH

A. Finish-General: Smooth form finish shall consist of a smooth, hard, uniform texture with a minimum of seams.

B. Radial Wall Finish: Float finish on radial face of wall shall consist of a smooth, hard, uniform surface of smooth steel trowel. level to a tolerance of ¼" inch in 10 feet when tested with a 10-foot steel straightedge placed on the surface horizontally, and vertically with radial template with the appropriate radii. Grinding the surfaces will not be an acceptable means of achieving the intended radii. Concrete finish work shall match the approved sample poured on site.

3.7 CONCRETE JOINTS

A. Cleaning: The entire joint shall be thoroughly cleaned and wetted prior to the application of additional shotcrete.

B. Reinforcement: Make joints perpendicular to the main reinforcement. Continue reinforcement across joints.

3.8 CONCRETE CURING AND PROTECTION

A. Curing Agent: Apply Clear spray-on cure agent after final finish is achieved. Submit proposed product to ENGINEER for approval. CONTRACTOR to remove cure agent at end of cure period and power wash all walls prior to final acceptance.

3.9 CLEAN UP

A. At completion of Work, remove concrete stains from adjacent work, including but not limited to dissimilar paving types, walls, columns, railing posts, light fixtures, plant materials, to satisfaction of ENGINEER.

B. Efflorescence: Remove efflorescence [as soon as practical after it appears] as part of final cleaning.

C. Use least aggressive cleaning techniques possible.

D. Wear protective eye wear, gloves, and clothing suitable to work and as required by cleaner manufacturer.

E. If proprietary cleaning agents are used, pre-wet wall, test cleaning agent on a small, inconspicuous area, and check effects prior to proceeding. Begin cleaning at the top and work down. Thoroughly rinse wall afterwards with clean water. Follow cleaner manufacturer's instructions.

F. Do not use muriatic (hydrochloric) acid on colored concrete.

END OF SECTION 03 37 13

SECTION 03 39 00 CONCRETE CURING

PART 1 – GENERAL

1.0 SPECIALTY SKATE PARK CONSTRUCTION

A. All work contained in this Section is considered specialty skate park construction. Only those firms that meet the minimum experience requirements contained in the QUALITY ASSURANCE Section and have been pre-qualified may perform this work as specified herein.

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to install all Concrete Curing related to the skate park as indicated on the Drawings complete as shown and as specified herein.

B. Related Work:
   1. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
   2. Section 03 37 13 – Shotcrete (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner. Comply with the current provisions of the following Codes and Standards:

B. ASTM - American Society for Testing and Materials:
   1. ASTM C94 – Ready-Mixed Concrete.
   2. ASTM C150 – Portland Cement.
   3. ASTM C271 – Sheet Materials for Curing Concrete.
   4. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
   5. ASTM F2480 – Standard Guide for In-ground Concrete Skate Park.

C. ACI – American Concrete Institute:
   1. ACI 301 – Specifications for Structural Concrete for Buildings.
   2. ACI 305 – Recommended Practice for Hot Weather Concreting.
   3. ACI 306 – Recommended Practice for Cold Weather Concreting.
   4. ACI 318 – Building Code Requirements for Reinforced Concrete.

D. UBC – Uniform Building Code

1.4 SUBMITTALS

A. In accordance with Contract Documents, General, Special and Technical Provisions.

B. Submit product data and manufacturer's instructions for:
   1. Curing compound.
   2. Proprietary cleaning agents.
   3. Plastic film for curing.
   4. Surface retarders.

1.5 QUALITY ASSURANCE

A. Safety and Performance Guidelines: Comply with all safety and performance requirements and all applicable references as specified in the ASTM F2480 Standard Guide for In-ground Skate Parks.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials in dry and protected locations and protect from damage.

1.7 SITE CONDITIONS

A. Environmental Requirements: Protect concrete against extreme cold and heat, frost, rapid drying, and damage by rain.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Curing Compound: ASTM C 309, non-staining, all resin type, white-pigmented, compatible with color admixture.

B. Acceptable Product: Burke Spartan-Cote Cure or equal. Curing Compound Application Rate: 350 sq. ft./U.S. Gallon (12.5m sq./L)

PART 3 - EXECUTION

3.1 CURING

A. Protect concrete surfaces against rapid drying. Keep sealed with cure agent for necessary amount of time to reach concrete strength and inhibit moisture loss after placing per manufacturer's recommendation.

B. Apply to exposed surface of concrete as soon as manufacturer recommends with an airless sprayer.

C. Apply to sides of concrete paving upon removal of form boards.

D. Meet requirements of manufacturer's current printed application instructions.

E. Uniformly apply 2 coats and apply the second coat at right angle to first coat.

F. Apply compound to form a continuous, uniform, coherent film that will not check, crack, or peel.

G. Do not apply to concrete that is still bleeding, or has a visible water sheen on the surface.

H. Protect paving surfaces from foot traffic with scuff-proof paper.

I. Immediately re-coat damaged areas of curing compound.

J. Protect surface from water, adjacent shotcrete work and debris.

3.2 CLEANUP

A. CONTRACTOR to remove all cure agent from concrete surface with power washing equipment and soft brush not causing abrasion to finish work surface prior to final inspection. No Cure Agent shall be present on any surfaces for final inspection acceptance. Remove debris and trash resulting from specified work.

END OF SECTION 03 39 00

DIVISION 5 – METALS

SECTION 05 50 00 METAL FABRICATIONS

PART 1 – GENERAL

1.0 SPECIALTY SKATE PARK CONSTRUCTION

A. All work contained in this Section is considered specialty skatepark construction. Only those firms that meet the minimum experience requirements contained in the QUALITY ASSURANCE Section and have been pre-qualified may perform this work as specified herein.

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to install all Metal Fabrications for the skatepark as indicated on the Drawings complete as shown and as specified herein.

B. Related Work:
   4. Section 03 10 00 – Concrete Formwork (Skate Park)
   5. Section 03 20 00 – Concrete Reinforcement (Skate Park)
   6. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
   7. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
   8. Section 03 30 53 – Colored Cast-In-Place Concrete (Skate Park)
   9. Section 03 37 13 – Shotcrete (Skate Park)
   10. Section 09 90 00 – Painting (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner. Comply with the current provisions of the following Codes and Standards:

B. ASTM - American Society for Testing and Materials:
   1. ASTM A36 – Structural Steel.
   2. ASTM A120 – Steel Pipe and Tubing.
   3. ASTM F2480 – Standard Guide for In-ground Concrete Skate Park.

C. UBC – Uniform Building Code

D. AWS – American Welding Society
   1. AWS D1.1 – Structural Welding Code (latest edition)

E. CRSI – Concrete Reinforcing Steel Institute: “Manual of Standard Practice,” latest edition.

F. AISC – American Institute of Steel Construction, Inc: “Specifications of Architecturally Exposed Structural Steel," latest edition.

1.4 QUALITY ASSURANCE

A. Qualifications of Fabricators: Experienced in fabrication of miscellaneous metals.

B. Qualifications of Welders: Welding shall be done only by certified welding operators currently qualified according to AWS D1.1.

C. Qualifications of Workmen: Provide at least one person who shall be present at all times during execution of this portion of the Work, and who shall be thoroughly familiar with the type of materials being installed, the referenced standards, the requirements of this Work, and who shall direct all work performed under this Section. Welds indicated may be made in shop or field with approval.

1.5 SUBMITTALS

A. Shop Drawings:
   1. Submit shop drawings for all custom fabricated items under this section. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories. Indicate welded connections using standard AWS welding symbols.

   2. Verification: Verify all measurements at the job. Show dimensions, sizes, thicknesses, gauges, finishes, joining, attachments, and relationship of work to adjoining construction. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from drawings.

B. Samples: Required for all Coping and Edging of concrete work. Submit finish metal samples for final finish selection. Submit prior to delivery to site. Attach name, address of manufacturer and/or supplier to each sample.

1.6 DELIVERY, STORAGE AND HANDLING

A. Storage of Materials: Materials which are stored at the project site shall be above ground on platforms, skids, or other supports. Protect steel from corrosion. Store other materials in a weather-tight and dry place until ready for use.

B. Protection:
   1. Use all means necessary to protect miscellaneous metals before, during and after installation and to protect the installed work and materials of all other trades.
   2. Protect any adjacent materials or areas below from damage due to weld splatter or sparks during field welding.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to the Owner.

1.7 JOB CONDITIONS

A. Examine existing conditions in which the work is to be installed. Notify ENGINEER if conditions are unacceptable to begin work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

1.8 COORDINATION

A. Templates and Built-ins: Furnish all anchors, fastenings, sleeves, setting templates and layouts affecting or installed in the work of other trades.

B. Delivery: Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient time that progress of work is not delayed. Be responsible for proper location of such items.

C. Coordination: Coordinate with work of Cast-In-Place Concrete Section 03 30 00.

1.9 JOB SITE SAMPLE

A. CONTRACTOR to provide fabricated, onsite sample of metal item(s), complete with approved finish, for review by Owner and ENGINEER before fabrication of total quantities. Any fabrication of project item(s) by CONTRACTOR before Owner review and approval is subject to rejection.

B. Approved sample(s) shall be used as the standard of workmanship and shall remain on site until work has been completed and approved by the ENGINEER.

PART 2 - PRODUCTS

2.1 MATERIALS

A. STEEL: As per drawing STEEL MATERIALS PLAN

2.2 GROUT: Non-shrinking Master Builder's "Embedco", Conrad Sovig's "Metel-Mxs Grout", Sonneborn's "Ferrolith G Redi-Mixed Grout"' or approved equal.

2.3 OTHER MATERIALS: All other materials, not specifically described but required for a complete and proper installation of miscellaneous metals, shall be new, first quality of their respective kinds and subject to the approval of the ENGINEER.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS

A. Inspection: Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Discrepancies: In the event of discrepancy, immediately notify the ENGINEER.

3.2 COORDINATION

A. General: Carefully coordinate with all other trades to insure proper and adequate interface of the work of other trades with the Work of this Section.

B. Delivery: Insure timely delivery of all metal fabrications which must be installed in other work so as not to delay that work.

3.3 INSTALLATION

A. General:
   1. Install metal fabrications in strict accordance with the Drawings, the approved Shop Drawings, and all applicable codes, regulations and standards.
   2. Obtain ENGINEER review prior to site cutting or making adjustments which are not parts of the scheduled work.
   3. Install items square and level, accurately fitted and free from distortion or defects.
   4. Align all metal fabrications as shown on the Drawings, and where vertical or horizontal members are shown. Align them straight, plumb and level within tolerance.
   5. Make provisions for erection stresses by temporary bracing. Keep work in alignment.
   6. Replace items damaged in course of installation.
   7. Perform field welding in accordance with AWS D1.1
   8. After installation, grind smooth and touch-up field welds.

3.4 WORKMANSHIP

A. Layout: Set all work plumb, true, rigid, and neatly trimmed out. Miter corners and angles of exposed molding and frames unless otherwise noted.

B. Fitting: Fit exposed connections accurately together to form tight hairline joints.

C. Labor: Employ only workmen specifically skilled in such work.

3.5 FABRICATION

A. Shop assemble in largest practicable dimensions, making members true to length so assembling may be done without fillers.

B. Provide all surfaces free of file marks, dents, hammer marks, wire edges or any unsightly surface defects.

C. STEEL PIPE COPING: Roll pipe to conform with top radius curve of each bowl and ledge as shown on drawings. Refer to drawings for relational tolerance to concrete surface and other steel.

3.6 ATTACHMENTS AND REINFORCEMENTS

A. Do all cutting, shearing, drilling, punching, threading, tapping, etc., required for site metalwork or for attachment of adjacent work. If applicable, drill or punch holes; do not use cutting torch.

B. OTHER CONNECTORS: Make all permanent connections in ferrous metal surfaces using welds where at all possible; do not use bolts or screws.

3.7 WELDING

A. Preparation: Remove all rust, paint, scale and other foreign matter. Wire brush all flame-cut edges. Clamp members as required and alternate welds, all as necessary to prevent warping or misalignment.

B. Exposed Welds: Uniformly grind smooth (no tolerance) all welds normally exposed to view and feel in the finished work.

D. Faulty and Defective Welding: Chip out and replace all welding showing cracks, slag inclusion, lack of fusion, bad undercut or other defects ascertained by visual or other means of inspection. Replace and re-weld at no cost to Owner.

E. Field Welding:
   1. Procedure: Comply with AWS code of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
   2. Protection: Protect all adjacent surfaces from damage due to weld sparks, spatter, or tramp metal.

3.8 SURFACE TREATMENT AND PROTECTIVE COATINGS

A. Cleaning:
   1. Thoroughly clean all mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to any galvanizing, or painting.
   2. Conditions which are too severe to be removed by hand cleaning, shall be cleaned using appropriate methods for solvent cleaning, power tool cleaning and brush-off blast cleaning.

B. Exterior Ferrous Metal:

   1. Grind smooth all welds, burrs, and rough surfaces. Clean all coping from grease.

   2. Shop coat iron metal items; using anti-rust primer (red color).

   3. All welds to be painted with primer after appropriate connections and grinding has taken place. Touch-up all scratched primer prior to shotcrete application.

3.9 CLEAN-UP

A. Keep all areas of work clean, neat and orderly at all times. Keep paved areas clean during installation.

B. Clean up and remove all debris from the entire work area prior to Final Acceptance to satisfaction of ENGINEER.

END OF SECTION 05 50 00

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07 92 00 JOINT SEALANTS

Part 1 General

1.1 DESCRIPTION

1. This section specifies joint sealants for masonry and concrete.

1.2 REFERENCES

1. Conform to ASTM C920-11

1.3 SUBMITTALS

1. Provide samples of Manufacturer's product brochures and product names, range of colours in each type of sealant for selection by Consultants

1.4 WARRANTY

1. Warranty work of this Section against defects and deficiencies for a period of 1 year from date of completion. Promptly correct, at no expense to Owner, any defects or deficiencies, which become apparent within warranty period. Defects shall include, but shall not be limited to, sag and failure in adhesion or cohesion, air and moisture leakage, hardening, running, sagging, change of colour, crumbling, melting, bubbling, and staining of adjacent materials.

1.5 ENVIRONMENTAL CONDITIONS

1. Do not apply any sealant at ambient temperatures below 39˚F without consulting Manufacturer and obtaining Consultant's approval. Apply only to completely dry surfaces.

Part 2 Products

2.1 MATERIALS

1. All sealants utilized in the sealant system shall be compatible.

2. Provide sealant formulation recommended by the Manufacturer for the type of joint, substrate and service conditions applicable.

3. Colours: charcoal/grey so as to blend with surround concrete features.

4. Sealant Type: Single-component, polyurethane base, chemical curing, non-sag, elastomeric sealant, Sikaflex 1a or approved equal meeting all standards and performance requirements.

5. Sealant Backing: Extruded, foamed, closed cell, round, polyethylene urethane, neoprene or vinyl rod, 30% greater diameter than joint width, with Shore ‘A’ hardness of 20 and 830 - 900 KPa tensile strength, and manufactured especially for the purpose.

6. Expansion Joint Filler: Preformed PVC closed cell, Rodofoam by Sternson Canada limited or approved equal.

7. Joint Primer: As recommended by sealant Manufacturer for type of surface being

primed.

Part 3 Execution

3.1 PREPARATION

1. Clean joints walls and spaces, which are to be sealed and ensure that they are dry and free of dust, loose mortar, oil, grease and other foreign material. Clean ferrous metals of all rust, mill scale and foreign materials by wire brushing, grinding or sanding.

2. Wipe all metal surfaces to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol or toluol and wipe dry with clean cloth. Where joints are to be sealed with silicone based sealants clean joint with methyl-ethyl-ketone (MEK) only. Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant. Check that ferrous metal surfaces are painted before applying sealant.

3. Examine joint sizes and correct to achieve proper width/depth ratio and as per drawings:

1/4" x 1/4"	minimum joint size
1/4" to 1/2"	depth shall equal width
1/2" to 2"	depth equal 1/3 of width or 1/2" whichever is less

   Install joint backing or apply bond breaker tape to achieve correct joint depth.

4. On horizontal traffic surfaces, support joint filler against vertical movement, which might result from traffic loads, including foot traffic.

5. Where surfaces adjacent to joints are likely to become coated with sealant during application, mask them prior to priming and sealing.

6. Prime sides of joints, if priming is recommended by sealant Manufacturer for type of surface being sealed.

7. Check form release agent used on concrete for compatibility with primer and sealant. If they are incompatible inform Consultant and change primer and sealant to compatible types approved by Consultant or clean concrete to Consultant's approval. Do not apply in presence of solvents.

3.2 APPLICATION

1. Apply sealant using hand-operated guns fitted with suitable nozzles and equipment approved by sealant Manufacturer. Apply in strict accordance with Manufacturer's directions and recommendations.

2. Apply sealant under pressure to assure good adhesion to sides of joints and to completely fill all voids in joint.

3. Form surface of sealant smooth, concave, free from ridges, wrinkles, sags, air pockets and embedded foreign matter.

4. Upon completion, remove masking, sealant smears and droppings from adjacent and other surfaces.

5. Use sealant specified for each type of following location. Ensure that sealant chosen for each location is recommended by Manufacturer for use for conditions encountered.

   a) Vertical Control Joints: Vertical joints in concrete elements; joints in paving; and all other locations where sealing is required. Vertical control jointing shall be included in any element exceeding 12ft. in length.

   b) Saw Cut Control Joints: Joints in horizontal concrete surfaces as indicated on plans. Joints are not to exceed 12ft. in spacing.

END OF SECTION 07 92 00

DIVISION 9 – THERMAL AND MOISTURE PROTECTION

SECTION 09 90 00PAINTING

PART 1 PART 1 – GENERAL

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to install all Painting for the skate park as indicated on the Drawings complete as shown and as specified herein.

B. This Section includes surface preparation and field painting of the following:
   1. Miscellaneous exposed exterior items and surfaces.

C. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Owner Representative will select from standard colors and finishes available.

1. Painting includes field painting of exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Finished metal surfaces include the following if used:
   a. Stainless steel.
   b. Bronze and brass.

c. Iron

2. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

B. Related Work:
1. Section 05 50 00 – Metal Fabrications (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner. Comply with the current provisions of the following Codes and Standards:

B. ASTM - American Society for Testing and Materials

C. UBC – Uniform Building Code

D. SSPC – Society for Protective Coatings: “Steel Structures Painting Manual,” latest edition.

1.4 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

PART 2 1.5 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.
1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
1. After color selection, the Owner Representative will furnish color chips for surfaces to be coated.

C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
3. Submit Samples on the following substrates for the Owner Representative's review of color and texture only:
   a. Ferrous Metal: Provide two 4-inch- (100-mm-) square samples of flat metal and two 8-inch- (200-mm-) long samples of solid metal for each color and finish.

PART 3 1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

PART 4 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

C. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.8 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.9 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.

1. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. (3.785 L) or 1 case, as appropriate, of each material and color applied.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.

2.2 MATERIALS

A. Material Compatibility: Provide fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Provide color selections made by the ENGINEER.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Owner Representative about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particularl substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
   a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
   a. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, covers, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

5. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Fillers: Apply fillers at a rate to ensure complete coverage of pores filled.

F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

G. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Owner Representative.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
   1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 EXTERIOR PAINT SCHEDULE

A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
   1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a rust-inhibitive primer.

a. Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils (0.033 mm).
   1) Devoe: 13101 Mirrolac Rust Penetrating Metal Primer.
   2) Fuller: 621-04 Blox-Rust Alkyd Metal Primer.
   3) Glidden: 5205 Glid-Guard Tank & Structural Primer, Red.
   4) Moore: IronClad Retardo Rust-Inhibitive Paint #163.
   5) PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
   6) P & L: S/D 1009 Suprime "9" Interior/Exterior Alkyd Metal Primer.

b. First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils (0.066 mm).
   1) Devoe: 17XX Wonder-Shield Semi-Gloss Exterior Acrylic Latex House and Trim Paint.
   2) Fuller: 664-XX Weather King II Semi-Gloss House & Trim Paint.
   3) Glidden: 6600 Series Spred Ultra Exterior Gloss Latex House & Trim Paint.
   4) Moore: MoorGlo Latex House & Trim Paint #096.
   5) PPG: 78 Line Sun-Proof Semi-Gloss Acrylic Latex House and Trim Paint.
   6) P & L: Z/F 3100 Series Aqua Royal Latex House & Trim Finish.

END OF SECTION 09 90 00

DIVISION 31 – EARTHWORKS

SECTION 31 23 13 SUBGRADE PREPARATION

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to perform all sub-grade preparation work for the skate park as indicated on the Drawings complete as shown and as specified herein.

C. Related Work:
   2. Section 31 00 00 – Earthwork (Skate Park)
   3. Section 03 10 00 – Concrete Formwork (Skate Park)
   4. Section 03 20 00 – Concrete Reinforcement (Skate Park)
   5. Section 03 30 00 – Cast-In-Place Concrete (Skate Park)
   6. Section 03 30 53 – Coloured Cast-In-Place Concrete (Skate Park)
   7. Section 03 37 13 – Shotcrete (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner.

B. Comply with the current provisions of the following Codes and Standards:
   1. ASTM - American Society for Testing and Materials.
   2. Standard Specifications
   3. Uniform Building Code

PART 2 - MATERIALS

2.1 SUITABLE MATERIALS

A. General: Fill, backfill, and embankment materials shall be suitable selected or processed clean, fine earth, rock, or sand, and free from grass, roots, brush, or other vegetation; contamination; or deleterious material. The size, gradation, and properties of the materials shall be in accordance with the requirements of the Soil Report and these specifications.

B. Aggregate base materials under pavements shall be crushed aggregate base material constructed to the thickness shown or specified. The percentage composition by weight of aggregate base shall conform to the Standard Specifications.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

A. Excavate and shape subgrade to line, grade, and cross-section shown on the Drawings.

B. Subgrade is that area on which pavement, surfacing, base, sub-base, or a layer of other material which may be specified, is to be placed.

C. Plow or scarify subgrade to a depth of 6" below the final subgrade elevation; and by harrowing, dry rolling and breaking clods, the earth shall be brought to finely divided condition. Remove boulders, hardened material, or rock encountered. The earth shall be uniform for the full depth and width of the subgrade.

D. Water loose earth to a uniform depth of 4".

E. Harrow the earth to mix the wet earth with the dry beneath, until the whole mass of loose material is at the proper state of moisture for compaction.

F. The finished subgrade, immediately prior to placing subsequent material thereon, shall be in accordance with the Standard Specifications and project soils report.

G. The finished surface of the subgrade, at any point, shall not vary more than 0.05' above or 0.2' below the elevation indicated on the drawings unless approved in writing by ENGINEER.

H. The Owner will not provide any additional compensation to the CONTRACTOR for hard rock or caliches excavation. Refer to the project soils report for test boring information and analysis.

3.2 BASE

A. Base shall be readily compacted and spread with equipment that will provide a uniform layer conforming to the planned section.

3.3 CLEANUP

A. Upon completion of the subgrade preparation and base, remove surplus construction materials, earth and debris so that the job site is left in a neat and orderly condition.

END OF SECTION 31 23 13
DIVISION 33 – UTILITIES

SECTION 33 40 00 STORM DRAINAGE

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. Requirements of the Contract Documents, including but not limited to, the General, Special, and Technical Provisions, apply to work in this Section with the same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

A. Furnish materials, labor, transportation, services, and equipment necessary to perform all storm drainage work for the skate park as indicated on the Drawings complete as shown and as specified herein. This section includes gravity-flow, non-pressure storm drainage for the skate park with the following components:
   1. Drains.
   2. Piping.

B. Provide storm water drainage system consisting of drain lines, inlets, trenching, bedding, backfill, and outfall connection for entire skate park as shown within the construction drawings.

C. Related Work:
   1. Section 31 23 13 – Sub-grade Preparation (Skate Park)
   2. Section 31 00 00 – Earthwork (Skate Park)

1.3 REFERENCES

A. Comply with the applicable reference specifications as specified in the GENERAL PROVISIONS and in accordance with applicable laws, codes and regulations required by the Owner.

B. Comply with the current provisions of the following Codes and Standards:
   1. ASTM - American Society for Testing and Materials.
   2. Standard Specifications (as specified in the General Provisions).
   3. UBC - Uniform Building Code.

1.4 COORDINATION

A. Coordinate all work affected by drainage operations. Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
   1. Notify Owner no fewer than 15 days in advance of proposed interruption of service.
   2. Do not proceed with interruption of service without Owner's written permission.

1.5 PROTECTION

A. Protect all existing tree roots, shrubs, paving and utilities from damage due to drainage excavations. Re-route piping if necessary to avoid excessive damage to existing conditions as directed by the ENGINEER to avoid damage. Provide protective barrier from all open trenches per Agency requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. PVC Drain Pipe: Manufacture in accordance with standards noted herein.

1. Marking and Identification: Continuously and permanently marked with manufacturer's name, pipe size, type of pipe and material, SDR number, ASTM standard number and the NSF (National Sanitation Foundation) seal.

2. PVC pipe fittings shall be of the same material as the PVC pipe specified and shall be compatible with PVC pipe furnished.

3. All drain pipes shall be SDR-35.

B. Drain Inlets

1. Floor Drain: Smith Drains 2005 series model A06-A10-NB (or approved equal) with 10" diameter. Body assembly shall accommodate a 6" SDR-35 drain line connection.

2. Materials & Finish: Body shall be Dura-Coated cast iron with bottom outlet, combination invertible membrane clamp and adjustable collar. Strainer shall be polished nickel.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork." Excavate ditch no greater in width or depth than is necessary to permit constructioN.

3.2 BEDDING

A. Provide a firm foundation of uniform density throughout the entire length of the pipe. The exterior of the pipe for not less than 1/4 of its circumference shall be bedded in an earth foundation of uniform density accurately shaped to fit the outside of the pipe. The material used for bedding shall be material from on-site excavation. When rock is encountered at grade, the rock shall be removed to a depth of six inches below grade and tamped, clean fill, rock free over ½", earth from the excavation shall be used to bring the elevation up to grade.

3.3 PIPING INSTALLATION

A. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

B. Do not place pipe in a wet trench. Keep trenches free from water.

C. Coupling: Use approved solvent weld joint or pressure coupling. Clean pipe and fittings thoroughly of dirt, dust and moisture. Apply a light uniform coat of solvent to pipe (or compression fitting if applicable) fitting and immediately make the connection.

3.4 BACKFILL

A. Backfill to grade according to Division 2 Section "Earthwork."

3.5 CONNECTION TO EXISTING DRAINAGE SYSTEM

Join gravity-flow, non-pressure drainage piping according to the following:

1. Join corrugated PE piping using silt-tight couplings.
2. Join PVC sewer piping according to UPC for elastomeric-seal joints and elastomeric gasket joints.
3. Join dissimilar pipe materials with pressure-type couplings.

3.6 FIELD QUALITY CONTROL

A. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

B. Alignment: Ensure that a light source is visible from structure to structure.

C. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.7 CLEAN UP

A. Clean interior of piping of dirt and superfluous materials.

B. Clean site daily of trash and debris resulting from construction operations.

C. Upon completion of the work, remove spoil piles, surplus material, and equipment from the site. Restore ground surface to original condition.

END OF SECTION 33 40 00

Item 48 **<u>Tennis Courts (includes fencing and nets):</u>**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to construct Tennis Courts as indicated in the plans. The bid price shall include all site preparation, courts, fencing, nets, and striping and finishing of the playing surface. Lighting for the tennis courts shall be included in Line Item # 58.

<u>PART ONE- GENERAL</u>

1.01 SUMMARY

A. This work includes sub surface preparation, hot mix asphalt (HMA) paving, net post and fence installation, and the acrylic color system applications for new tennis courts.

1.02 QUALITY ASSURANCE

A. Installing firm: Installer must regularly engage in construction and color acrylic surfacing. Documented experience in athletic surface paving, and acrylic color system applications must be provided. Minimum of 10 projects similar in complexity in the last 3 years.
B. Surfacing shall conform to the guidelines of the ASBA, (American Sports Builders Association).

1.03 SUBMITTALS

A. Provide to the ENGINEER for approval, manufacturer specifications for all products, asphalt mix design, color chart and installation instructions.
B. Shop drawings indicating layout and placement of asphalt, color system, lines, net systems, fence and gates shall be submitted to the ENGINEER for approval.
C. Any products requiring submittals that are installed without the approval of the ENGINEER will be replaced by the CONTRACTOR at no additional expense to the CITY.

1.04 MATERIAL HANDLING AND STORAGE

A. Store materials in accordance with manufactures specifications and MSDS.
B. All surfacing material shall be non-flammable.
C. NO MATERIAL STORED ON SITE during the duration of the project unless fully secured with fencing.

1.05 GUARANTEE

A. Provide guarantee against defects in the materials and workmanship for a period of one (1) year from the date of substantial completion unless otherwise stated.

PART TWO- PRODUCTS

2.01 MANUFACTURERS

A. Master Halco, Inc. / Fencing and gate material.
B. Douglas Industries, Eldridge IA./ Athletic Equipment.
C. U.S. Tennis Court Construction Company Lockport, IL 60441/ Elite Sport Coating System.
D. Local Asphalt plant with qualified mix.
E. Approved equals.

2.02 MATERIAL/PRODUCTS

A. Round Steel Pipe Fence Framework: Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.
B. Chain Link Fabric- Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.
C. Tension Wire- Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with ITEM 41: **Item 41: Splash Park Fencing** for specifications.
D. Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.
E. Gates- Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.
F. Aggregate Base Course (CA-6)- graded and compacted base course.
G. HMA Binder Course (N-50 Binder Course)- Lower course of pavement with maximum aggregate size no more than three-quarters of one inch (3/4”).
H. HMA Surface Course (N-30 Surface Course) -fine graded asphalt course with one half inch (1/2”) maximum aggregate or smaller, free of reclaimed asphalt

shingles (RAS) and with no more than 25% reclaimed asphalt pavement (RAP), applied over reinforcement grid.

I. Patching Mix (Elite Patch Binder)-for use in patching cracks, holes, depressions,
"birdbaths" and other surface imperfections.
J. Acrylic Patch Crack Filler (Elite Acrylic Patch Crack Filler)-for use in filling cracks.
K. Acrylic Resurfacer (Elite Acrylic Resurfacer)- Mixed with approved silica sand and applied as a filler coat on new or existing asphalt surfaces and for pre-coating rough areas.
L. Acrylic Color Playing Surface (Elite Color Concentrate) mix with approved silica sand and applied over acrylic resurfacer or textured acrylic color.
M. Textured Line Paint (Elite Textured Line Paint)-for use as line or graphic marking on play surface.
N. Net Post Sleeves (Douglas GS-24 #63424)-Installed in concrete footings 2 per court.
O. Center anchor (Douglas center tie down anchor # 63428)- Installed in concrete. One (1) per court.
P. Tennis Net Posts Douglas DTP-37 #63007(green) -Installed in ground sleeve; 2 per court.
Q. Tennis Net (Douglas TN-40 #20040)- Install to tennis net posts.
R. Center strap (Douglas Deluxe adjustable CS #20600)-Fastened to center anchor.
S. Approved equal products.

PART THREE- EXECUTION

3.01 WEATHER LIMITATIONS

A. Do not install when raining or rain is imminent.
B. Do not install if surface is wet or damp.
C. Do not apply unless surface and air temperatures are 50°F and rising.
D. Do not apply if surface temperature is more than 140°F.

3.02 SITE INSPECTION, PREPARATION

A. Remove and dispose of all trees and vegetation including root systems.
B. Locate utilities.
C. Prepare the bearing surface for the court area in accordance with Section 5.0 (Pavement Area Recommendations) of the Geotechnical Report by Universal Engineering Sciences, Inc. (attached to these bidding documents).

3.03 ENGINEERING

A. Proper grade elevation shall be set on proposed court areas.
B. All excavating, filling, compacting, grading, and leveling required shall be performed so that the finish court surface has a slope of no less than 0.83% and 1% on a true plane from side to side or end to end. Net line crowning will not be acceptable.

3.04 BASE COURSE

A. Aggregate base course shall be added as needed with a minimum thickness

of eight inches (8”) to obtain required elevations and compaction.

B. Elevations to be set in base course with a 0.83%-1% pitch end to end or side to side.
C. Proof roll with a fully loaded six-yard dump truck prior to asphalt paving.
D. All soft areas shall be replaced with compacted aggregate base course

3.05 ASPHALT PAVING

A. BINDER COURSE
   a. Machine apply and compact HMA Surface course to a compacted thickness of no less than two inches (2”) over prepared stone base.
   b. HMA shall be free of marks, segregation and be placed to required uniform elevation with a smooth texture not showing tearing, shoving, or gouging.
   c. Paving equipment shall be equipped with auger extensions, and be self-propelled.
   d. Hand work shall be minimized to ensure the best possible finished surface.
   e. Rolling shall start as soon as the HMA can be compacted without displacement. Rolling shall continue until the HMA is thoroughly compacted and all roller marks have disappeared. Compact the HMA to a minimum in-place density of 94.0% of the Theoretical Maximum Specific Gravity.
   f. Binder course longitudinal joints shall be smooth and true; no deviation from level and true.
   g. Smoothness shall meet the requirements of no greater than one eighth inch (1/4”) in ten feet (10’).
   h. Binder course asphalt must be placed in one day, special care shall be taken to avoid cold seams.

B. SURFACE COURSE
   a. Machine apply and compact HMA Surface course to a compacted thickness of no less than one and one half inches (1.5”) over HMA binder course.
   b. HMA shall be free of marks, segregation and be placed to required uniform elevation with a smooth texture not showing tearing, shoving, or gouging.
   c. Paving equipment shall be equipped with auger extensions, and be self-propelled.
   d. Hand work shall be minimized to ensure the best possible finished surface.
   e. Rolling shall start as soon as the HMA can be compacted without displacement. Rolling shall continue until the HMA is thoroughly compacted and all roller marks have disappeared. Compact the HMA to a minimum in-place density of 94.0% of the Theoretical Maximum Specific Gravity.
   f. Surface course longitudinal joints shall be smooth and true; no deviation from level and true.
   g. Smoothness shall meet the requirements of no greater than one eighth inch (1/8”) in ten feet (10’).
   h. Surface course asphalt must be placed in one day, special care shall be taken to avoid cold seams.

3.06 TENNIS POSTS SLEEVES, POSTS, AND NETS

A. Tennis post foundations shall be situated to provide a clear distance between posts of fort-two feet (42') apart.
B. Net post sleeves shall be installed with foundations of no less than twenty-four inches (24") in diameter at the top, no less than thirty inches (30") in diameter at the base, and no less than forty-eight inches (48") in depth
C. Center strap anchor foundations shall be no less than twelve inches (12") in diameter at the top, no less than sixteen inches (16") at the base, and no less than twelve inches
(12") in depth.
D. Install tennis posts in sleeves, follow manufacturer's installation guidelines.
E. Install tennis nets, follow manufacturer's installation guidelines.
F. Install center straps, follow manufacturer's installation guidelines.

3.07 FENCING

All tennis court fencing to be 10 ft. height.

A. FRAMEWORK INSTALLATION

Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.

B. CHAIN LINK FABRIC INSTALLATION
Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.

C. GATE INSTALLATION
Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.

D. NUTS AND BOLTS
Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.

3.08 COURT DEPRESSIONS "BIRDBATHS"

A. Testing: Surface shall be flooded with water by rain or manually with clean water. Surface shall be allowed to drain for 45-60 minutes in sunlight at 70°F. Remaining depressions holding enough water to cover a five cent piece (American Nickel) shall be marked.
B. Apply acrylic patch binder mix to depressions and strike off with a straight edge. Before the product begins to dry, feather edges using a trowel, putty knife, or similar method.
C. Repeat testing and acrylic patch binder applications as needed to eliminate or reduce depressions to within tolerance.
D. Sand and pre-coat as needed to assure repairs are not visible following acrylic surface applications.
E. Strictly follow manufactures mixture guidelines and weather limitations.

3.09 ACRYLIC FILLER COAT(S) (RESURFACER)

A. Two (2) coats of properly textured acrylic resurfacer shall be applied to entire surface. Special care shall be taken to keep a wet edge and remain consistent.
B. When surface is completely dry, surface shall be inspected for, ridges, bumps, and debris. Any inconsistencies shall be corrected prior to color coat applications.
C. Strictly follow manufactures mixture guidelines and weather limitations.

3.10 ACRYLIC COLOR PLAYING SURFACE

A. Complete a thorough inspection, remove any bumps or ridges in resurfacer coats, and clean surface of all loose dirt, leaves, or other debris.
B. If the surface is to receive multiple colors, apply chalk lines to distinguish the court area from the perimeter area. Follow USTA guidelines for court dimensions.
C. Colors and their placement shall be determined by the owner. Colors and the placement of the colors shall be verified by the owner prior to color applications.
D. Textured acrylic color surface shall be applied in two (2) applications with a 50 durometer rubber squeegee. No application should be made until the previous application is thoroughly dry.
E. Strictly follow manufactures guidelines and weather limitations.

3.11 LINE PAINTING

A. Lines shall be carefully laid out in accordance with the ASBA guidelines.
B. Masking tape shall be applied and rolled to result in a two inch (2") wide width unless otherwise stated.
C. Masked lines shall be primed with acrylic line primer to seal the void between the textured surface and masking tape edge.
D. One (1) coat of textured white line paint shall be applied by brush or roller. NO SPRAY APPLICATIONS PERMITTED.

3.12 PROTECTION

A. Erect temporary barriers to protect coatings during drying and curing.
B. Lock gates to prevent use until acceptance by the owner.

3.13 CLEAN UP

A. Site shall be cleared of all construction debris, all waste shall be disposed of offsite in accordance with local, state and federal regulations.
B. Remove all barriers and locks.

The basis of payment for **Tennis Courts (includes fencing and nets)** is LUMP SUM.

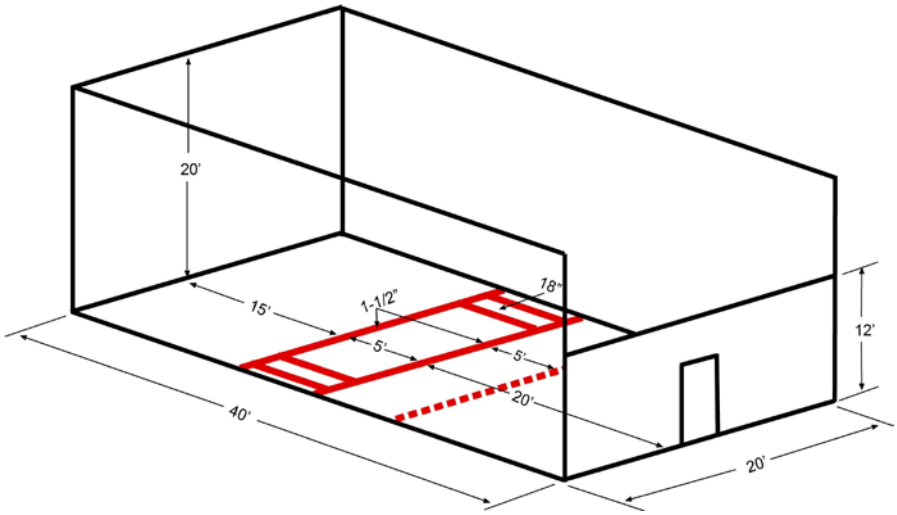
Item 49 **<u>Raquetball Courts (Includes fencing):</u>**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to construct the double racquetball courts and fencing as indicated plans and specifications.

No back wall will be necessary.

A shop drawing of the proposed construction of the racquetball courts and fencing must be submitted to the ENGINEER for approval before construction and materials are purchased.

The general configuration of the court shall be as shown below:



The plan dimensions of the court, measured 3 feet above the finished floor level shall be: Length: 40 feet ± 4 inches or 1.00%

Width: 20 feet ± 3 inches or 1.25%

Height: 20 feet ± 3 inches or 1.25%

The clear height above the finished floor level (e.g., the height to the underside of the lowest obstruction) over the whole of the court shall be not less than 20 feet ± 3 inches.

The court walls shall be plumb vertically to within 1 inch in 20 feet at any place on the court.

A. Straightness of Court Walls

The walls of the court shall be straight to within ± 1-1/2 inches in the length of the side wall and 1 inch in the length of the front wall.

B. Plane of Court Walls

The walls of the court shall be plane and

a. have no indentions, holes or open joints more than 3/32 inch in any dimension in the plane of the wall; and

b. have no variation from the true surface of more than 1/8 inch in 12 inches.

C. The Floor

1. The playing floor shall be within 1/8 inch in any 10 foot radius.

2. Any joint in the floor finish shall be plane to within 1/16 inch. Any open joint shall not be more than 3/32 inch wide except that an expansion gap not more than 1/2 inch wide is recommended at the junction of the floor and the side walls and not more than 3/16 inch wide is recommended at the junction of the floor and the front and rear walls.

D. Court Markings

1. All court markings are recommended to be 1-1/2 inches wide and colored bright white.

2. All court markings shall be straight to within ± 1/16 inch in 10 feet.

3. The maximum variation from the correct position of any court marking at any point shall not exceed 1/4 inch.

4. Court dimensions

a. The dimensions shall be 20 feet wide, 40 feet long, and 20 feet high with a back wall at least 12 feet high.

b. All surfaces shall be in-play with the exception of any gallery opening or surfaces designated as court hinders.

5. Lines and zones – racquetball courts shall be divided and marked with lines 1-1/2 inch wide as follows:

Short Line: The back edge of the short line is midway between and is parallel with the front and back walls.

Service Line: The front edge of the short line is midway between and is parallel with the front and back walls.

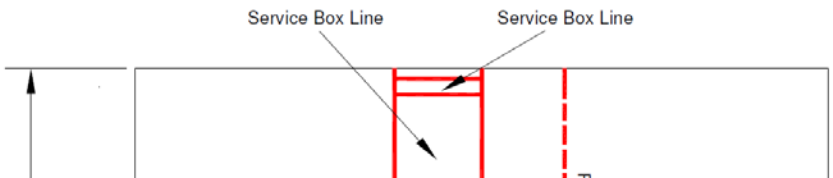
Service Zone: The service zone is the 5 foot area between the outer edges of the short line and the service line.

Service Boxes: The service boxes are located at each end of the service zone and are designated by lines parallel with the side walls. The edge of the line nearest to the center of the court shall be 18 inches from the nearest side wall.

Drive Service Line: The drive serve lines, which form the drive serve zone, are parallel with the side wall and are within the service zone. The edge of the line nearest to the center of the court shall be 3 feet from the nearest side wall.

Receiving Line: The receiving line is a broken line parallel to the short line. The back edge of the receiving line is 5 feet from the back edge of the short line. The receiving line begins with a line 21 inches long that extends from each side wall; the two lines are connected by an alternate series of 6 inch spaces and 6 inch lines.

Safety Zone: The safety zone is the 5 foot area bounded by the back of the edges of the short line and the receiving line. The zone is observed only during the serve.



Court Walls

A. Construction of Court Walls

Each wall of the court shall be of the same construction over the whole of the playing area except as allowed under Section II.C above.

B. Strength of Court Walls

The walls of the court and all components in them shall be capable of withstanding all the stresses which may be placed upon them in normal play as a result of the impact of balls, racquets and players, and shall not suffer any permanent or temporary damage as a result of these impacts.

C. Deflection of Court Walls

1. The walls of the court shall not deflect under the impact of the ball in normal play to such an extent or in such a manner that the rebound of the ball is affected.

2. The walls may deflect under the impact of players if it is necessary for their structural integrity that they should do so. The amount of any such deflection shall not exceed the appropriate limits specified below following an impact equivalent to that of a human body with a mass of 200 lbs. and a coefficient of absorption of 47% traveling at the moment of impact at a speed of 10 feet per second and striking the wall at right angles to it over an area of not more than

5.4 square feet at a height to the center of the impact area of 4.8 feet (± 2 inches) in the middle third of any panel on the wall or, in the case of a wall of homogenous construction over the whole of its area, in the middle third of the wall:

a. in the case of glass walls: 1-1/4 inch at the center of the impact area; and

b. in the case of all other walls: 1/4 inch at the center of the impact area.

3. Any wall which deflects as allowed by the above paragraph shall return to its original static position within one second of the initial impact and shall suffer no temporary or permanent damage as a result of the deflection.

D. Wall Finishes

All playing walls of the court shall have a hard smooth surface.

E. Color of Court Walls

All playing surfaces of the court are recommended to be of the same color and reflectance unless glass is used. If the back wall is a solid wall, it shall be of the same color and reflectance as the front and side walls.

F. Reflectance of Walls

The average reflectance of the front and side walls shall not be less than 80% at any point when in a clean condition.

G. Ball Rebound from the Court Walls

The ball shall rebound truly on striking all parts of the playing walls. The ball shall be consistent over the whole area of each wall.

H. Joints in Playing Surfaces

Any open joint in the finish of a wall for panel construction shall:

a. not deflect the rebound of the ball in any way;

b. not be larger than 1/16 inch in the plane of the wall surface; and

c. be constructed in such a manner as to ensure that adjacent areas of the finish cannot move relative to one another at right angles to the plane of the wall following the impact of the ball, a racquet, or a player, except in the case of doors in glass walls as allowed by described under Section V.D.2 below of this Specification.

I. Flank Wall Panels (Optional)

The plane of the side walls of the court can be extended behind a glass back wall for a distance of not less than 12 inches and to a height of not less than 8 feet above finished floor level inside the court by means of fixed or moveable panels of the same color and texture as the side walls of the court.

J. Wall to Wall and Wall to Ceiling Junctions

There shall be no protrusions of any kind into the court at the junction of one wall with another other than a caulking bead having the same color as the court walls and ceiling for aesthetic appearance.

K. Wall to Floor Junctions

There shall be no protrusion of any kind into the court at the junction of any wall of the court with the floor. An expansion joint may be provided at the junction of any wall of the court with the floor but is recommended to not exceed the gaps described under Section III.F.2.

I. The Floor of The Court

A. The Floor Finish

The floor finish is recommended to be hard, smooth, and have a degree of resiliency and provide a firm footing and normal play.

B. Resilience

1. The bounce of the ball shall be of even height and pace over the entire area of the floor.

2. When viewed from vertically above the line of the flight of the ball, the linear path of the ball shall not be affected when it bounces on the floor.

C. Color and Reflectance

1. The floor is recommended to be light and relatively consistent in color as not to hide appearance of the ball during low shots.

Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **Item 41: Splash Park Fencing** for specifications.

The basis of payment for **Raquetball Courts (Includes fencing)** is LUMP SUM.

Item 50 **Basketball Court (Includes goals):**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to construct a Basketball Court as indicated in the construction plans. The bid price shall include site preparation, court, goals, and striping and finishing of the playing surface. Lighting for the basketball court will be bid as a separate pay item.

PART ONE- GENERAL

1.01 SUMMARY

A. This work includes sub surface preparation, hot mix asphalt (HMA) paving, net post and fence installation, and the acrylic color system applications for new tennis courts.

1.02 QUALITY ASSURANCE

A. Installing firm: Installer must regularly engage in construction and color acrylic surfacing. Documented experience in athletic surface paving, and acrylic color system applications must be provided. Minimum of 10 projects similar in complexity in the last 3 years.
B. Surfacing shall conform to the guidelines of the ASBA, (American Sports Builders Association).

1.03 SUBMITTALS

A. Provide to the ENGINEER for approval, manufacturer specifications for all products, asphalt mix design, color chart and installation instructions.
B. Shop drawings indicating layout and placement of asphalt, color system, lines, net systems, fence and gates shall be submitted to the ENGINEER for approval.
C. Any products requiring submittals that are installed without the approval of the ENGINEER will be replaced by the CONTRACTOR at no additional expense to the CITY.

1.04 MATERIAL HANDLING AND STORAGE

A. Store materials in accordance with manufactures specifications and MSDS.
B. All surfacing material shall be non-flammable.
C. NO MATERIAL STORED ON SITE during the duration of the project unless fully secured with fencing.

1.05 GUARANTEE

A. Provide guarantee against defects in the materials and workmanship for a period of one (1) year from the date of substantial completion unless otherwise stated.

PART TWO- PRODUCTS

2.01 MANUFACTURERS

A. IPI by Bison, Lincoln, NE / Basketball Goals.
B. U.S. Tennis Court Construction Company Lockport, IL 60441/ Elite Sport Coating System.
C. Local Asphalt plant with qualified mix.
D. Equals for (A) and (B) approved by ENGINEER

2.02 MATERIAL/PRODUCTS

A Aggregate Base Course (CA-6)- graded and compacted base course.
B. HMA Binder Course (N-50 Binder Course)- Lower course of pavement with maximum aggregate size no more than three-quarters of one inch (3/4").
C. HMA Surface Course (N-30 Surface Course) -fine graded asphalt course with one half inch (1/2") maximum aggregate or smaller, free of reclaimed asphalt shingles (RAS) and with no more than 25% reclaimed asphalt pavement (RAP), applied over reinforcement grid.
D. Patching Mix (Elite Patch Binder)-for use in patching cracks, holes, depressions, "birdbaths" and other surface imperfections.
E. Acrylic Patch Crack Filler (Elite Acrylic Patch Crack Filler)-for use in filling cracks.
F. Acrylic Resurfacer (Elite Acrylic Resurfacer)- Mixed with approved silica sand and applied as a filler coat on new or existing asphalt surfaces and for pre-coating rough areas.
G. Acrylic Color Playing Surface (Elite Color Concentrate) mix with approved silica sand and applied over acrylic resurfacer or textured acrylic color.
H. Textured Line Paint (Elite Textured Line Paint)-for use as line or graphic marking on play surface.
I. Bison © Ultimate 72 Inch Perforated Steel Commercial Basketball Goal (2).
J. Equal products approved by ENGINEER.

PART THREE- EXECUTION

3.01 WEATHER LIMITATIONS

A. Do not install when raining or rain is imminent.
B. Do not install if surface is wet or damp.
C. Do not apply unless surface and air temperatures are 50°F and rising.
D. Do not apply if surface temperature is more than 140°F.

3.02 SITE INSPECTION, PREPARATION

A. Remove and dispose of all trees and vegetation including root systems.
B. Locate utilities.

C. Prepare the bearing surface for the court area in accordance with Section 5.0 (Pavement Area Recommendations) of the Geotechnical Report by Universal Engineering Sciences, Inc. (attached to these bidding documents).

3.03 ENGINEERING

A. Proper grade elevation shall be set on proposed court areas.
B. All excavating, filling, compacting, grading, and leveling required shall be performed so that the finish court surface has a slope of no less than 0.83% and 1% on a true plane from side to side or end to end. Net line crowning will not be acceptable.

3.04 BASE COURSE

A. Aggregate base course shall be added as needed with a minimum thickness of eight inches (8") to obtain required elevations and compaction.
B. Elevations to be set in base course with a 0.83%-1% pitch end to end or side to side.
C. Proof roll with a fully loaded six-yard dump truck prior to asphalt paving.
D. All soft areas shall be replaced with compacted aggregate base course

3.05 ASPHALT PAVING

A. BINDER COURSE
   a. Machine apply and compact HMA Surface course to a compacted thickness of no less than two inches (2") over prepared stone base.
   b. HMA shall be free of marks, segregation and be placed to required uniform elevation with a smooth texture not showing tearing, shoving, or gouging.
   c. Paving equipment shall be equipped with auger extensions, and be self-propelled.
   d. Hand work shall be minimized to ensure the best possible finished surface.
   e. Rolling shall start as soon as the HMA can be compacted without displacement. Rolling shall continue until the HMA is thoroughly compacted and all roller marks have disappeared. Compact the HMA to a minimum in-place density of 94.0% of the Theoretical Maximum Specific Gravity.
   f. Binder course longitudinal joints shall be smooth and true; no deviation from level and true.
   g. Smoothness shall meet the requirements of no greater than one eighth inch (1/4") in ten feet (10').
   h. Binder course asphalt must be placed in one day, special care shall be taken to avoid cold seams.

B. SURFACE COURSE
   a. Machine apply and compact HMA Surface course to a compacted thickness of no less than one and one half inches (1.5") over HMA binder course.
   b. HMA shall be free of marks, segregation and be placed to required uniform elevation with a smooth texture not showing tearing, shoving, or gouging.
   c. Paving equipment shall be equipped with auger extensions, and be self-

propelled.

d. Hand work shall be minimized to ensure the best possible finished surface.
e. Rolling shall start as soon as the HMA can be compacted without displacement. Rolling shall continue until the HMA is thoroughly compacted and all roller marks have disappeared. Compact the HMA to a minimum in-place density of 94.0% of the Theoretical Maximum Specific Gravity.
f. Surface course longitudinal joints shall be smooth and true; no deviation from level and true.
g. Smoothness shall meet the requirements of no greater than one eighth inch (1/8") in ten feet (10').
h. Surface course asphalt must be placed in one day, special care shall be taken to avoid cold seams.

3.06 BASKETBALL GOALS

A. Install basketball goals with foundations per manufacturer's installation guidelines, ensuring basket rim is exactly 10 ft. above playing surface. Position goal posts at center of baselines, so that backboards are plumb with and parallel to baselines.

3.07 FENCING (Section deleted)

3.08 COURT DEPRESSIONS "BIRDBATHS"

A. Testing: Surface shall be flooded with water by rain or manually with clean water. Surface shall be allowed to drain for 45-60 minutes in sunlight at 70°F. Remaining depressions holding enough water to cover a five cent piece (American Nickel) shall be marked.
B. Apply acrylic patch binder mix to depressions and strike off with a straight edge. Before the product begins to dry, feather edges using a trowel, putty knife, or similar method.
C. Repeat testing and acrylic patch binder applications as needed to eliminate or reduce depressions to within tolerance.
D. Sand and pre-coat as needed to assure repairs are not visible following acrylic surface applications.
E. Strictly follow manufactures mixture guidelines and weather limitations.

3.09 ACRYLIC FILLER COAT(S) (RESURFACER)

A. Two (2) coats of properly textured acrylic resurfacer shall be applied to entire surface. Special care shall be taken to keep a wet edge and remain consistent.
B. When surface is completely dry, surface shall be inspected for, ridges, bumps, and debris. Any inconsistencies shall be corrected prior to color coat applications.
C. Strictly follow manufactures mixture guidelines and weather limitations.

3.10 ACRYLIC COLOR PLAYING SURFACE

A. Complete a thorough inspection, remove any bumps or ridges in resurfacer coats, and clean surface of all loose dirt, leaves, or other

debris.

B. If the surface is to receive multiple colors, apply chalk lines to distinguish the court area from the perimeter area. Follow USTA guidelines for court dimensions.

C. Colors and their placement shall be determined by the owner. Colors and the placement of the colors shall be verified by the owner prior to color applications.

D. Textured acrylic color surface shall be applied in two (2) applications with a 50 durometer rubber squeegee. No application should be made until the previous application is thoroughly dry.

E. Strictly follow manufactures guidelines and weather limitations.

3.11 LINE PAINTING

A. Lines shall be carefully laid out in accordance with the ASBA guidelines.

B. Masking tape shall be applied and rolled to result in a two inch (2") wide width unless otherwise stated.

C. Masked lines shall be primed with acrylic line primer to seal the void between the textured surface and masking tape edge.

D. One (1) coat of textured white line paint shall be applied by brush or roller. NO SPRAY APPLICATIONS PERMITTED.

3.12 PROTECTION

A. Erect temporary barriers to protect coatings during drying and curing.

3.13 CLEAN UP

A. Site shall be cleared of all construction debris, all waste shall be disposed of offsite in accordance with local, state and federal regulations.

B. Remove all barriers and locks.

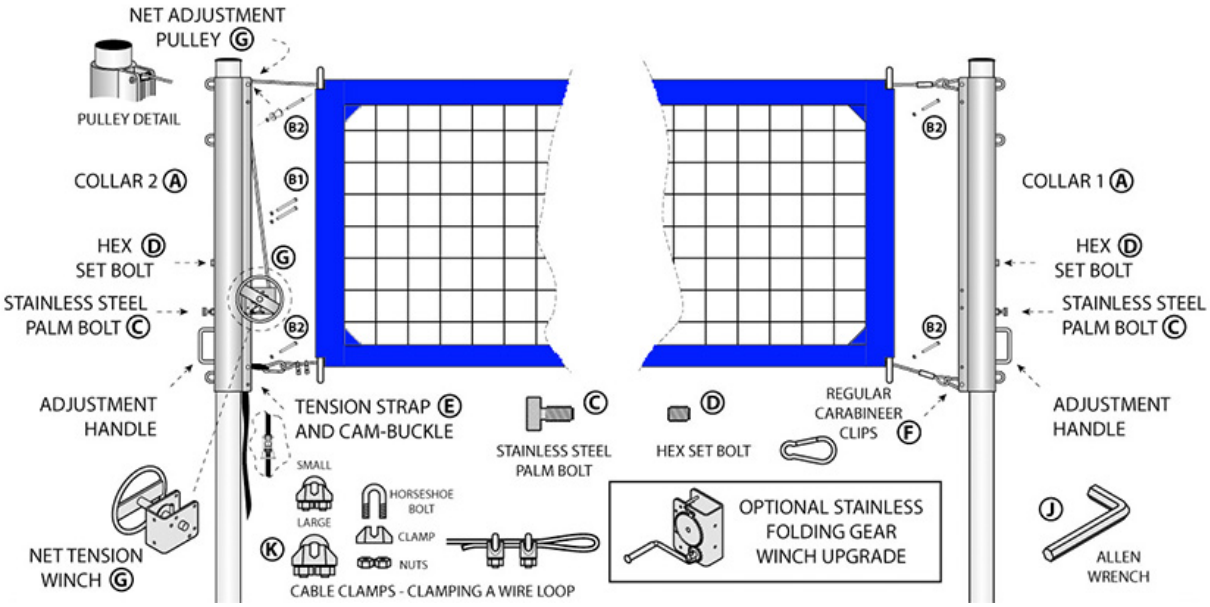
The basis of payment for **Basketball Court (Includes goals)** is LUMP SUM.

Item 51 **<u>Volleyball Court:</u>**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and to construct a sand volleyball court as per the construction plans. The bid price submitted by the CONTRACTOR for this item shall include furnishing and installing the following components;

1. Total sand area shall be 46' X 76'
2. Sand area surrounded by 2" X 12 pressure treated lumber topped with HDPE EDGEGUARD.
3. Court shall be 30' X 60"
4. Boundary lines shall be 2" ribbon tied to the four corners with buried anchors. A bungee court should be attached to each corner and connected to a buried plastic anchor disk (without sharp edges).
5. 2' of beach quality TAN sand (sieve analysis submitted to engineer of record for approval)
6. 6" of #57 stone at bottom of sand
7. Poles shall be 5" galvanized steel padded to prevent injury and embedded three feet below the 57 stone and surrounded by a 12" X 12" concrete footer.

8. Net shall be professional grade and include the components included below:



The CONTRACTOR must submit shop drawings, cut sheets, technical data sheets and installation instructions for to the ENGINEER for approval before construction begins. Product assembly and installation shall be in accordance with MANUFACTURER's instructions and requirements. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Volleyball Court** is LUMP SUM.

Item 52 **<u>Dog Park:</u>**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to construct a dog park as per the construction plans. The bid price submitted by the CONTRACTOR for this item shall include furnishing and installing the following components;

1. Fencing (chain link, black polymer coated, 6 ft. height) and access gates. Refer to construction plans for fencing layout. Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **ITEM 41: Splash Park Fencing** for specifications.
2. Two (2) Dog waste stations (Bow Wow Waste® Commercial Dog Waste Station – Roll Bag Dispenser System Item #: BW-006, Green Color, or approved equal). One dispenser to be installed in small dog section, one dispenser to be installed in large dog section.
3. Two (2) commercial yard hydrants (Murdock Manufacturing, Inc. Model #

M-2000 Post Hydrant, Pedal Operated, ¾" inlet connection, or approved equal). One hydrant to be installed in small dog section, one hydrant to be installed in large dog section.

4. Two (2) 3' x 3' square concrete splash pads at yard hydrants. Concrete to be 4" slab thickness, non-reinforced, 3,000 psi mix, broom finished. Finished slab grade to match adjacent grade. Compact soil underneath slab in accordance with *Section 4.3 Site Preparation for Shallow Foundations* of the Geotechnical Report (included with bidding documents). Construct one pad at each hydrant, centering edge adjacent to hydrant on faucet.
5. 3/4" PVC water service to hydrants.
6. Signage
    a. Dog Park Rules SignatureSign © 24" x 18", Part No. K-0124, dogpoopsigns.com, (800) 952-1457.
    b. Small Dog Area Sign 9" x 12", Part No. K2-4261, dogpoopsigns.com, (800) 952-1457.
    c. Large Dog Area Sign 9" x 12", Part. No. K-0484, dogpoopsigns.com, (800) 952-1457
    d. Approved equals for a., b. and c. above.

The four (4) benches at the Dog Park shown on the construction plans are to be included in the bid price for, and shall be paid under, **Item 57: Benches,** and the one (1) Shade Structure shown on the construction plans is to be included in the bid price for, and shall be paid under, **Item 31: Shade Structures.**

The basis of payment for **Dog Park** is LUMP SUM.

Item 53 **Lifetrail© Advanced Wellness System - 3 Stations:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to furnish and install three (3) Lifetrail© Advanced Wellness System fitness stations as indicated in the construction plans. The CONTRACTOR shall submit shop drawings, installation instructions and technical data sheets for the stations to the ENGINEER for approval prior to ordering or installing any fitness stations. Any stations installed without the approval of the ENGINEER will be replaced by the CONTRACTOR at no additional expense to the CITY.

Preparation of the sub-foundations for the fitness stations and installation of the fitness stations shall be in accordance with the MANUFACTURER'S instructions and requirements. Any required compaction or other testing of the sub-foundations shall be included in the unit cost for **Item 6: Grading and Compaction.**

The basis of payment for **Lifetrail© Advanced Wellness System - 3 Stations** is per LINEAR FOOT.

Item 54 **Baseball Field Fencing:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to construct baseball field fencing (chain link, black polymer coated, variable heights) as indicated in the construction plans. Refer to Section 32 31 13 CHAIN LINK FENCE AND GATES included with **ITEM 41: Splash Park Fencing** for fencing specifications. The bid price for this

item does not include demolition and hauling away of the existing baseball field fencing; the bid price for **Item 5 (Demolition and Hauling)** shall include the cost of removal and disposal of the existing fence.

The basis of payment for **Baseball Field Fencing** is per LINEAR FOOT.

Item 55 **Pavilion:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to construct one (1) RCP Shelters, Inc. Model LW-G2030-03 pavilion (including concrete slab) as indicated in the construction plans. An equal product from an alternative MANUFACTURER may be substituted with approval from the ENGINEER and the CITY.

Prepare the bearing surface for the concrete slab in accordance with Section 4.3 (Site Preparation for Shallow Foundations) of the Geotechnical Report by Universal Engineering Sciences, Inc. (attached to these bidding documents). Bearing surface shall be treated for termites by a pesticide applicator licensed in the State of Florida prior to pouring concrete slab. A 15 mil thickness plastic vapor barrier shall be placed on bearing surface prior to placing formwork and concrete reinforcement. Concrete slab shall be sized to provide 1 ft. clearance from outside faces of pavilion columns; 4" thickness, 3000 PSI mix, reinforced with 6 x 6 x 10/10 welded wire mesh fabric, placed at 2 inches height from bottom of slab. Maintain minimum of 2 inches concrete cover over edges of welded wire mesh fabric. Use only non-metallic spacers and chairs for positioning welded wire mesh fabric. The poured slab shall be broom finished. The CONTRACTOR shall submit concrete mix design, compaction/moisture testing results, and shop drawings/cut sheets for vapor barrier and all reinforcing materials to the ENGINEER for approval prior to placing any materials or pouring any concrete. Any items placed before approval shall be removed and replaced by the CONTRACTOR at no additional cost to the CITY.

The CONTRACTOR must submit shop drawings, cut sheets, technical data sheets and installation instructions (including any instructions pertaining to footers for pavilion columns) for to the ENGINEER for approval before construction begins. Pavilion assembly and installation shall be in accordance with MANUFACTURER's instructions and requirements. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Pavilion** is LUMP SUM.

Item 56 **Picnic Tables:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to properly furnish and install picnic tables (Four (4) Anova Wainwright Model RCPWT63, Two (2) Anova Wainwright Model RCPWT63A) as indicated in the construction plans.

Shop drawings of the picnic tables must be submitted to the ENGINEER in writing for approval before any construction begins. Picnic table installation shall be in accordance with Manufacturer's instructions and recommendations. Any products or materials purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding products or

materials are not approved by the ENGINEER.

The basis of payment for Picnic Tables is per EACH.

Item 57 **Benches:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware to properly furnish and install benches (Anova Wainwright Model RCPWC6) as indicated in the plans.

Shop drawings of the benches and installation instructions must be submitted to the ENGINEER in writing for approval before any construction begins. Bench assembly and installation shall be in accordance with MANUFACTURER's instructions and requirements. Any products or materials purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding products or materials are not approved by the ENGINEER.

The basis of payment for **Benches** is per EACH.

Item 58 **Trash Receptacles:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to furnish and install the trash receptacles (Anova Wainwright Model RCPWCT) at the locations indicated in the plans.

The CONTRACTOR must submit a shop drawing of the trash receptacle and a shop drawing detailing the installation. Installation shall be in accordance with MANUFACTURER's instructions and requirements. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Trash Receptacles** is per EACH.

Item 59 **Lighting, Electrical Distribution, Service Connections:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to furnish and install the following items;

- Upgraded pole-mount electrical service drop(s) from FPL distribution network.
- Electrical service connections to renovated restroom building, new restroom/splashpark equipment room building.
- Electrical service connections to sanitary lift station, and all pumps and other electrical equipment on the project site not designated for removal/abandonment in the construction plans.
- All pole-mounted lighting fixtures for trailways and sidewalks.
- All streetlamps for the paved roadway and parking areas.
- All pole-mounted lighting fixtures for tennis courts, racquetball courts, volleyball courts, basketball court and skatepark (NOTE: existing pole-mounted baseball field lighting fixtures are to remain).
- All area lighting fixtures for trees, flag pole, landscaped areas, entry gateway and other features as indicated on the construction plans.

- Electrical outlets and electrical distribution system to farmers market area, event pavilion, recreational pavilion, electrical utility outlets mounted on lighting poles, security camera system and maintenance shed.

The CONTRACTOR is responsible for coordinating with FPL and creating any easement documents necessary.

The CONTRACTOR must submit shop drawings, cut sheets and technical data sheets detailing all components to be used to the ENGINEER and the CITY for approval. The CONTRACTOR is responsible for ensuring that the electrical distribution system and the connection to existing electrical service is in compliance with all applicable sections of the Florida Building Code (Latest Edition) and City of Edgewater standards and specifications. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Lighting, Electrical Distribution, Service Connections** is LUMP SUM.

Item 60 **6" PVC Water Main:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 6" PVC water line as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **6" PVC Water Main** is per LINEAR FOOT.

Item 61 **6" X 6" Tapping Sleeve:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 6" X 6" Tapping Sleeve as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **6" X 6" Tapping Sleeve** is per EACH.

Item 62 **16" X 6" Tapping Sleeve and Valve**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 16" X 6" Tapping Sleeve and Valve as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **16" X 6" Tapping Sleeve and Valve** is per EACH.

Item 63 **6" Gate Valve:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 6" Gate Valve as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **6" Gate Valve** is per EACH.

Item 64 **3/4" Water Service to Dog Park and Storage Shed:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the 3/4" Water Service and Meters to the dog park and equipment shed as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **3/4" Water Service to Dog Park and Storage Shed** is per LUMP SUM.

Item 65 **Reroute 6" Water Line:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to reroute the 6" waterline around the proposed storage shed as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Reroute 6" Water Line** is per LUMP SUM.

Item 66 **Remove Existing Fire hydrant and Install 6" Cap:**

The bid price for this item shall include, but not be limited to, Remove Existing Fire hydrant and Install 6" Cap the necessary manpower, equipment, materials and hardware needed to install the 16" X 6" Tapping Sleeve and Valve as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Remove Existing Fire hydrant and Install 6" Cap** is

LUMP SUM.

Item 67 **Fire Hydrant Assembly:**

The bid price for this item shall include, but not be limited to, Remove Existing Fire hydrant and Install 6" Cap the necessary manpower, equipment, materials and hardware needed to install the Fire Hydrant Assembly as indicated in the plans.

The CONTRACTOR must submit a shop drawing detailing the materials and installation. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR's expense if the corresponding materials are not approved by the ENGINEER.

The basis of payment for **Fire Hydrant Assembly** is per EACH.

Item 68 **Landscaping:**

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plants (trees, shrubs, groundcover, etc.).

1.2 SCOPE OF WORK

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.

1.3 CONTRACTOR RESPONSIBILITIES

A. Provide all equipment, materials and labor necessary for completion of work.

B. Obtain all necessary permits, licenses and fees necessary for completion of the work. Comply with all applicable codes.

C. Provide safe storage for all equipment and materials. Keep pavements clean and work area in an orderly condition.

D. Conduct a preinstallation conference on the Project Site.
   1. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.
   2. Relative positions of all plants and trees are subject to approval of the ENGINEER. See Part 3 Execution for more information.

E. Coordinate all work around underground utilities with Owner and General CONTRACTOR to avoid conflict with other portions of the work on this project. Determine location of underground utilities before excavating; hand excavate where required to avoid damage to utilities. Contact utility locating services at least 72 hours before excavation. The utility location service for most utilities is the Florida Utility Locating Service at 800-432-4770.

F. Repair, at no cost to the Owner, any damage occurring on the property, adjacent properties, or right-of-way by his work or his employees.

G. Carry all necessary insurance as specified in the General Conditions.

H. Make all necessary adjustments to establish healthy, vigorous plants. Fine grading for an even final appearance is critical.

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 ENGINEER 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 ENGINEER.

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.

1.5 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 329200 – Turf and Grasses
      b. Section 328400 – Planting Irrigation

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.ars- grin.gov/npgs/searchgrin.html
   b. Manual of Woody Landscape Plants; Michael Dirr; Stipes Publishing, Champaign, Illinois; Most Current Edition.
5. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign IL, most current edition.

1.6 DEFINITIONS

A. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced withtwine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1. Soil shall be removed to expose root flare if not evident at installation. Trees growing in field soil for at least 12 months prior to harvest.

B. Bare-Root Stock: Not Allowed.

C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well- established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required. **Kinked / circling roots shall not be allowed.**

D. Finish Grade: Elevation of finished surface of planting soil.

E. 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.

F. Kinked ("circling") root: A root within the root package that bends more than 90 degrees. Also see "Stem Girdling Roots".

G. Maintenance: Actions that preserve the health of plants after installation and as defined in this specification.

H. Maintenance period: The time period, as defined in this specification, which the CONTRACTOR is to provide maintenance.

I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

J. Normal: the prevailing protocol of industry standard(s).

K. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

L. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

M. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

N. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. Per plans.

O. Reasonable and reasonably:
   1. 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 defects, but that some accepted industry protocols and standards result in plants unacceptable to this project.
   2. 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.
   3. 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 ENGINEER’s expert shall determine when conditions are judged as reasonable.

P. Root ball: The mass of roots including any soil or substrate that is shipped with the tree within the root ball package.

Q. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk. Soil should be removed to expose this flare if needed.

R. Root Stabilization System: As directed by plans, 2x2 pine stakes with associated crossbars. These shall be used in place of standard staking/guying details.

S. Shrub: Woody plants with mature height approximately less than 15 feet.

T. 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.

U. Stem Girdling Roots: 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. Roots that encircle the stems (trunks) of trees below the soil surface. Potential circling roots shall be removed upon installation to avoid such problems.

V. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

W. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

X. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

Y. Structural root: One of the largest roots emerging from the root collar.

Z. Tree: Single and multi-stemmed plants with mature height approximately greater than 15 feet.

1.7 SUBMITTALS

A. All submittals are to be made in writing per the General Conditions.

B. 15 Samples: Soil test report of soil mix with recommendations for pH adjustment of soil.

C. Product Data: For each type of product indicated.
   1. Fertilizers
   2. pH Adjusters
   3. Pesticides and Herbicides. Include product label and manufacturer's application instructions specific to this project.
   4. Topsoil and soil conditioner; submit one quart of topsoil, yard sand, and soil conditioner if requested.
   5. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Such photographs are especially important for the Palm and shade trees. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

   1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

C. Do not prune trees and shrubs before delivery or following installation. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Reject dried-out plants.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Landscape Architect and Owner no fewer than two (2) days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Landscape Architect's and Owner's written permission.

C. Landscape work may proceed at any time or season agreed upon by the CONTRACTOR and the ENGINEER. However, schedule and perform landscape work only when weather and soil conditions are suitable in accordance with local practice. Do not install plant materials when temperatures drop below 35 degrees or above 95 degrees Fahrenheit, nor when wind velocity exceeds 10 miles per hour.

D. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1.10 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond CONTRACTOR's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Substantial Completion:

a. Trees, Shrubs, Vines, and Ornamental Grasses: Twelve (12) months.
b. Ground Covers, Biennials, Perennials, and Other Plants: Twelve (12) months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.11 QUANTITIES

A. In the event of a variation between the 1) plant quantities shown on the plans and the 2) required spacing-dependent quantity for a planting area, the required spacing shall control.

PART 2 – PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant List shown on Drawings and complying with Florida Grades & Standards (Grade #1 or better; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches

where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling and/or circling roots will be rejected.

2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with Florida Grades & Standards for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

1. Plant size is to take precedence over container size.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to Florida Grades and Standards. Root flare shall be visible before planting.

D. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

E. All plant material shall be graded #1 or Florida Fancy as outlined under the most current *Grades and Standards for Nursery Plants*, State Plant Board of Florida.

2.2 PLANTING SOIL

A. Fine sand or loamy fine sand indigenous to the area suitable for plant growth that is free of weeds, roots, stumps, rocks larger than 1/2" diameter, organic muck, hard pan, toxic substances detrimental to plant growth, and construction debris such as limerock, concrete, and asphalt pieces. Deliver in a normally moist condition, neither muddy nor wet. Soil used for topsoil shall meet the following criteria measured in accordance with the appropriate AASHTO and ASTM standard:

1. USDA Texture: Fine Sand, Loamy fine sand
2. AASHTO Classification: A-3
3. pH 5.0-7.5
4. Deleterious Material 0-2% maximum by mass (rocks, roots, sod)
5. Organic Matter Content 1-10% by mass
    a. Preferred is final tested organic matter between 2.75 and 4% (by dry weight)
6. Sand Content 80-96% by mass
7. Silt & Clay Content 3-10% by mass

B. Use existing soil in plant pits if the soil complies with the standard for topsoil, unless the soil is contaminated with limerock, clay, brush, weeds, roots, stumps, stones larger than 1 ½ inches in any dimension, litter and other extraneous or toxic matter harmful to plant growth. Remove contaminated soil and replace with acceptable stockpiled existing soil, new topsoil or yard sand.

C. All shrubs shall have a planting hole dug 2x the width and depth of the root ball. Back fill shall be composed native soil and soil mix. See landscape notes "SOIL MIX" for guidance on development of soil mix.

2.3 ORGANIC SOIL AMENDMENTS

A. Provide 100% organic soil conditioner, free of limerock, clay, brush, weeds, roots, stumps, gravel, litter and other extraneous or toxic matter harmful to plant growth. Soil conditioner shall be one of the following:

1. Compost: Meet requirements of Florida Department of Environmental Protection Rule 62.709.550 Type Y (yard waste). Compost shall be 100% organic yard and tree trimmings with a 25/1 carbon/nitrogen ratio, mature and stable, free of pathogens, weed seeds, and debris, composted for a minimum of 15 days at 131 degrees F., with at least 3 turnings, then shredded to pass through a 1/2 inch mesh screen. Available from Enviro-Comp Services, Inc.; 11771 Phillips Highway; Jacksonville, Fl 32256; 904-292-1828.
2. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials. Mechanically shredded pine bark with at least 90% of particle size ¼" or less. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

2.4 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Develop to address soil test. If no soil test is required, provide 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.5 MULCHES

A. Pinestraw Mulch: Provide air-dry, clean, mildew- and seed-free, mulch

2.6 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.7 TREE STABILIZATION MATERIALS

A. Stakes and Guys are to be used only on transplanted trees. Stabilization of transplanted trees per arborists direction.

B. Root Stabilization System

1. Crossbars: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2x6 untreated pine, nominal by lengths indicated, located on both sides of the tree. Qty: 4 per tree.
2. Straps: ¾" polyester strapping with plastic or metal earth anchors per manufacturer guidelines.
3. Stabilization system shall remain in place to naturally decay in place. Cut polyester straps following establishment.

C. Palm Bracing:
1. Wood battens: 2"x8" rough sawn pine battens pre-cut with notch for support timbers and fitted with steel restraining strap.
2. Wooden Braces: 2"x4" rough sawn pine supports.

2.8 MISCELLANEOUS PRODUCTS

A. Burlap: Non-synthetic, biodegradable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. CONTRACTOR shall obtain soil testing for the areas around proposed project site. A minimum of 3 areas shall be tested. 15 samples, distributed per agreement with Landscape Architect, shall be taken for each area; 6"-10" in depth. Results shall be reviewed with the Owner and Landscape Architect prior to planting. This shall be mixed and submitted for testing for the following factors:
1. pH / Buffer pH
2. Organic content / Sand content / Silt and Clay Content (percentage)
3. Phosphorous / Potassium / Calcium / Magnesium
4. AASHTO classification

B. CONTRACTOR shall provide landscape bed preparation, including removal and disposal of existing landscape and trees (trees to remain are noted on plan). CONTRACTOR shall pull any applicable permits, such as tree removal permit.

C. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. If soil does not meet definition for PLANTING SOIL (as defined in part 2) or contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 PLANT GUIDELINES / PLACEMENT

A. Planting design reflects that vegetation that exceeds twenty-five (25) feet in height at maturity should not be planted closer than fifteen (15) feet of the vertical plane of an existing power line, excluding service wires. Notify Landscape Architect immediately of any potential conflict with overhead utilities.

B. 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 ENGINEER of any conflicts encountered.

C. 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.

D. Trees shall not be planted closer than 7.5' from the centerline of underground utilities.

E. Non-canopy trees shall not be planted closer than two (2) feet from any pavement edge. Canopy trees shall be planted no closer than six (6) feet from any pavement edge.

3.3 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Remove shrubs and root mass to depth of 12” minimum.

D. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
1. 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 ENGINEER of any conflicts encountered.
2. Notify the ENGINEER, 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 ENGINEER's approval. Secure the ENGINEER's acceptance before digging and start of planting work.

3. 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.

E. Assure that soil moisture is within the required levels prior to planting. Irrigation, if required, shall not be applied less than 12 hours prior to planting to avoid planting in muddy soils.

F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.4 PLANTING AREA ESTABLISHMENT

A. Soil in tree islands shall have at least 12" of suitable soil for tree plantings, and be void of any construction debris or unsuitable materials.

B. Loosen subgrade of planting areas to a **minimum depth of 12 inches**. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply commercial fertilizer directly to subgrade before loosening.
2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. At the time of final grading, add fertilizer or acidifier if required to the planting soil at rates recommended by the testing results for the plants to be grown.
c. 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.

3. Spread planting soil to a depth of 12 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

1. Assure that soil grades in the beds are smooth and as shown on the

plans.

D. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

E. Application of Mycorrhizal Fungi: At time directed by Landscape Architect, broadcast dry product uniformly over prepared soil at manufacturers application rate.

3.5 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping gradually inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately two times as wide as ball diameter for balled and burlapped and container-grown stock.
2. Do not excavate deeper than 90% depth of the root ball, measured from the root flare to the bottom of the root ball.
3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
5. Maintain supervision of excavations during working hours.
6. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
7. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Back fill with planting mix. See "soil mix" guidelines in Landscape Notes. Subsoil and topsoil removed from excavations may be used as planting soil.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow complete percolation before positioning trees and shrubs.

3.6 TREE, SHRUB, AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare approximately 1 inch above adjacent finish grades (10% of root ball above grade).

1. Use planting soil (soil mix) for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
    a. Back fill with planting mix. See "soil mix" guidelines in Landscape Notes. Subsoil and topsoil removed from excavations may be used as planting soil.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container-grown stock plumb and in center of planting pit or trench with root flare approximately 1 inch above adjacent finish grades (10% of root ball above grade).

1. Use planting soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. 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.

3.7 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 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.

3.8 MECHANIZED TREE SPADE PLANTING (not anticipated)

A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field- grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

C. Cut exposed roots cleanly during transplanting operations.

D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.

E. Plant trees as shown on Drawings, following procedures in "Tree, Shrub, and Vine Planting" Article.

F. Where possible, orient the tree in the same direction as in its original location.

3.9 TREE, SHRUB, AND VINE PRUNING

A. Prune plants as directed by the ENGINEER. Pruning trees shall be limited to addressing structural defects as shown in details; follow recommendations per ANSI A300 and ISA best management practices.

3.10 TREE STABILIZATION

A. Install root stabilization as follows unless otherwise indicated:

1. Site-Fabricated Root Stabilization Method:

a. Cut 2x6 pine crossbars the width of the root ball approximately 6” from the trunk.
b. Attached the crossbars to the polyester straps and stakes, as shown on planting detail plans.
c. Install Root Stabilizers per tree, 12” apart on either side of the tree trunk.

B. Palm Bracing: Tree staples, as noted on plans.

1. Wood battens: Secure five (5) layers of burlap to trunk and tighten wooden battens to trunk with metal retaining bands.
2. Wooden Braces: Drive bases of brace into ground a minimum of 24” and toe-nail into wood battens. Space three supports evenly on the diameter of each tree. Paint black.

3.11 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.

B. Use planting soil (soil mix) for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.12 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas a minimum of 3". Apply a minimum of 2-3 inches depth of pine straw 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 abutting pavement.

B. Apply mulch to the bed being sure not to cover the tops of the plants with or the tops of the root ball with mulch.

C. 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 and spaced at least six inches away from the tree trunk.

D. Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.

3.13 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards (see University of Florida Department of Entomology for more information). Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.14 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written

recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground- cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.15 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other CONTRACTORs and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

D. Spray down base of building to remove soil from construction activities.

3.16 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property. Recycle materials as appropriate.

END OF SECTION 329300

The basis of payment for **Landscaping** is LUMP SUM.

Item 69 <u>Sodding:</u>

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sodding.

1.2 SCOPE OF WORK

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 turf 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 turf and seed.
   2. Water all specified turf.
   3. Maintenance of all specified turf until the beginning of the warranty period.
   4. Clean up and disposal of all excess and surplus material.
   5. Maintenance of all specified plants during the warranty period.

C. Achieve establishment as defined in this section for sod and seeding areas.

1.3 CONTRACTOR RESPONSIBILITIES

A. Provide all equipment, materials and labor necessary for completion of work.

B. Obtain all necessary permits, licenses and fees necessary for completion of the work. Comply with all applicable codes.

C. Provide safe storage for all equipment and materials. Keep pavements clean and work area in an orderly condition.

D. Conduct a preinstallation conference on the Project Site.

E. Coordinate all work around underground utilities with Owner and General CONTRACTOR to avoid conflict with other portions of the work on this project. Determine location of underground utilities before excavating; hand excavate where required to avoid damage to utilities. Contact utility locating services at least 72 hours before excavation. The utility location service for most utilities is the Florida Utility Locating Service at 800-432-4770.

F. Repair, at no cost to the Owner, any damage occurring on the property, adjacent properties, or right-of-way by his work or his employees.

G. Carry all necessary insurance as specified in the General Conditions.

H. Make all necessary adjustments to establish healthy, vigorous sod. Fine grading for an even final appearance is critical.

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 ENGINEER 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 ENGINEER.

B. In the case of a discrepancy in the turf quantities between the plan drawings and the plant call outs, list or plant schedule, the square footage of the turf bed actually drawn on the plan drawings shall be deemed correct and prevail.

1.5 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 329300 – Plants
    b. Section 328400 – Planting Irrigation

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.ars- grin.gov/npgs/searchgrin.html
    b. Manual of Woody Landscape Plants; Michael Dirr; Stipes Publishing, Champaign, Illinois; Most Current Edition.
5. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign IL, most current edition.

1.6 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. 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.

C. Maintenance: Actions that preserve the health of plants after installation and as defined in this specification.

D. Maintenance period: The time period, as defined in this specification, which the CONTRACTOR is to provide maintenance.

E. Normal: the prevailing protocol of industry standard(s).

F. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

G. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs,

mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

H. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See drawing designations for planting soils.

I. Reasonable and reasonably:
   1. 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.
   2. 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.
   3. 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 ENGINEER's expert shall determine when conditions are judged as reasonable.

J. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

K. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

L. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.7 SUBMITTALS

A. All submittals are to be made in writing per the General Conditions.

B. Landscape CONTRACTOR Qualifications: Submit CONTRACTOR qualifications before award, if requested. Include the date the business was established and a list of 3 completed installations of similar scope. Include location; name and address of owner; and date when each project was completed.

   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
   2. Maintenance Proximity: Not more than two (2) hours' normal travel time from Installer's place of business to Project site.
   3. Pesticide Applicator: State licensed, commercial.

C. Product Data: For each type of product indicated.

   1. Soil testing, if requested by Owner.

   2. Fertilizers.

3. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project

4. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.9 PROJECT CONDITIONS

A. Landscape work may proceed at any time or season agreed upon by the CONTRACTOR and the ENGINEER. However, schedule and perform landscape work only when weather and soil conditions are suitable in accordance with local practice. Do not install plant materials when temperatures drop below 35 degrees or above 95 degrees Fahrenheit, nor when wind velocity exceeds 10 miles per hour.

B. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Sodded Turf: Sixty (60) days from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 TURFGRASS SOD

A. Turfgrass Sod: Certified, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: Bahia (*Paspalum notatum 'Argentine'*) Zoysia (*Zoysia japonica 'Empire')*

2.2 PLANTING SOIL

A. Fine sand or loamy fine sand indigenous to the area suitable for plant growth that is free of weeds, roots, stumps, rocks larger than 1/2" diameter, organic muck, hard pan, toxic substances detrimental to plant growth, and construction debris such as limerock, concrete, and asphalt pieces. Deliver in a normally moist condition, neither muddy nor wet. Soil used for topsoil shall meet the following criteria measured in accordance with the appropriate AASHTO and ASTM standard:

1. USDA Texture: Fine Sand, Loamy fine sand
2. AASHTO Classification: A-3
3. pH 5.0-7.5
4. Deleterious Material 0-2% maximum by mass (rocks, roots, sod)
5. Organic Matter Content 1-10% by mass
6. Sand Content 80-96% by mass
7. Silt & Clay Content 3-10% by mass

B. Use existing soil in plant pits if the soil complies with the standard for topsoil, unless the soil is contaminated with limerock, clay, brush, weeds, roots, stumps, stones larger than 1 ½ inches in any dimension, litter and other extraneous or toxic matter harmful to plant growth. Remove contaminated soil and replace with acceptable stockpiled existing soil, new topsoil or yard sand.

2.3 ORGANIC SOIL AMENDMENTS

A. In areas requiring additional organic material, provide 100% organic soil conditioner, free of limerock, clay, brush, weeds, roots, stumps, gravel, litter and other extraneous or toxic matter harmful to plant growth. Soil conditioner shall be one of the following:

1. Compost: Meet requirements of Florida Department of Environmental Protection Rule 62.709.550 Type Y (yard waste). Compost shall be 100% organic yard and tree trimmings with a 25/1 carbon/nitrogen

ratio, mature and stable, free of pathogens, weed seeds, and debris, composted for a minimum of 15 days at 131 degrees F., with at least 3 turnings, then shredded to pass through a 1/2 inch mesh screen. Available from Enviro-Comp Services, Inc.; 11771 Phillips Highway; Jacksonville, Fl 32256; 904-292-1828.

2. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials. Mechanically shredded pine bark with at least 90% of particle size ¼" or less. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

2.4 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Develop to address soil test. If no soil test is required, provide 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.5 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy

conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If soil does not meet definition for PLANTING SOIL (as defined in part 2) or contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 TURF AREA PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Remove shrubs and root mass to depth of 12” minimum. Trees and palms shall remain as indicated on the plans.

D. Limit turf subgrade preparation to areas to be planted.

E. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1/2 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply commercial fertilizer (as defined in part 2) directly to subgrade before loosening.

2. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

3. Spread planting soil to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet. Reduce elevation of planting soil to allow for soil thickness of sod.

F. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil. Apply pre- and post-emergent herbicides.

2. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
3. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

G. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

H. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

I. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.3 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.4 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. (If applicable) Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.5 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

3.6 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Landscape Architect / ENGINEER:
1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even- colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.7 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's

written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.8 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

The basis of payment for **Sodding** is per SQUARE YARD.

Item 70 **Irrigation:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and hardware needed to install the irrigation system and connect to the existing reclaimed water lines as indicated in the plans.

The CONTRACTOR must submit shop drawings detailing the connections, control panels and sprinklers. Any products or materials manufactured, purchased or installed prior to shop drawing approval will need to be replaced at the CONTRACTOR’s expense if the corresponding materials are not approved by the ENGINEER.

SECTION 32 84 00 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Piping.
2. Valves.
3. Automatic control valves.
4. Sprinklers.
5. Drip Irrigation.
6. Controllers.
7. Boxes for automatic control valves.

1.2 SCOPE OF WORK

A. Irrigation system required for this work includes, but is not limited to, the furnishing of all labor, tools, materials, appliances, tests, permits, taxes, etc., necessary for the installation of a landscape irrigation system as herein specified and shown on the drawings, and the removal of all debris from the site.

1. Locate, purchase, deliver and install piping, conduit, sleeves, 120 volt and low voltage electrical and water connections, valves, backflow preventer devices, controllers, rain sensors, spray and bubbler heads, drip irrigation lines, and associated accessories for a fully operational automatic irrigation system.
2. Trenching and water settling of backfill material.
3. Testing and startup of the irrigation system.
4. Prepare an as built record set of drawings.
5. Training of the Owner's maintenance personnel in the operational requirements of the Irrigation system.
6. Clean up and disposal of all excess and surplus material.
7. Maintenance of the irrigation system during the proscribed maintenance period.

B. Existing Irrigation System Operation:

1. CONTRACTOR shall run through all zones, determining zones within the area of new work. Cap valves for all such zones at the main line.
2. CONTRACTOR shall inspect system and provide any maintenance recommendations. CONTRACTOR shall verify that existing pump provides flow and pressure for system to function as designed. See section 1.4 Performance Requirements.

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 Sections
   a. Section 329300 – Plants (includes planting soils)
   b. Section 329200 – Turf and Grasses
3. References:
   a. American Society of Testing Materials (ASTM): cited section numbers.
   b. National Sanitation Foundation (NSF): rating system.
   c. Irrigation Association: Turf & Landscape Irrigation Best Management Practices

1.4 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

1. Irrigation piping and related equipment are drawn diagrammatically. Scaled dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions and immediately notify the ENGINEER of discrepancies between the drawings or specifications and the actual conditions. Although sizes and locations of plants and or irrigation equipment are drawn to scale wherever possible, it is not within

the scope of the drawings to show all necessary offsets, obstructions, or site conditions. The CONTRACTOR shall be responsible to install the work in such a manner that it will be in conformance to site conditions, complete, and in good working order.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:

1. Designed Running Pressure: **50 gallons per minute; 40 psi** at the sprinkler head.

1.5 ACTION SUBMITTALS

A. Pressure testing information / results for the main line and laterals, as noted in PART 3 – EXECUTION.

1.6 INFORMATIONAL SUBMITTALS

A. Zoning Chart: Show each irrigation zone and its control valve.

B. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

C. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

B. As built record set of drawings for the new system. Include clock scheduling guidance for both standard and daylight savings time.

1.8 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All products are to be those expressed or implied on the Drawings.

B. All products must conform to their respective codes and regulations.

C. All products are to be installed and utilized in accordance with manufacturer's recommendations, Florida Irrigation Society Standards, and general irrigation installation standards and Southern Standard Building and Congress Codes.

2.2 MATERIALS GENERAL

A. All materials shall be of standard, approved and first grade quality and shall be new and in perfect condition when installed and accepted.

B. All controllers, valves, and heads shall be manufactured by the following manufacturer(s) (or approved equal).

1. All equipment shall be Rainbird.
2. Hunter is an approved equal.

C. Approval of any items or substitutions indicates only that the product(s) apparently meet the requirements of the drawings and specifications on the basis of the information or samples submitted. The CONTRACTOR shall be responsible for the performance of substituted items. If the substitution proves to be unsatisfactory or not compatible with other parts of the system, the CONTRACTOR shall replace said items with the originally specified items, including all necessary work and modifications to replace the items, at no cost to the owner.

2.3 RECLAIMED WATER SYSTEM DESIGNATION

A. Where irrigation systems use reclaimed water, all products including valve boxes, lateral and main line pipe, etc. where applicable and/or required by local code shall have the reclaimed water purple color designation.

2.4 PIPING MATERIAL

A. Individual types of pipe and fittings supplied are to be of compatible manufacturer unless otherwise approved. Pipe sizes shown are nominal inside diameter unless otherwise noted.

B. Plastic pipe:

1. All pipe shall be free of blisters, internal striations, cracks, or any other defects or imperfections. The pipe shall be continuously and permanently marked with the following information: manufacturer's name or trade mark, size, class and type of rating, quality control identifications, date of extrusion, and National Sanitation Foundation (NSF) rating.
2. Pressure main line for piping upstream of remote control valves and quick coupling valves:
    a. Pipe smaller than 2 inch diameter (typical of laterals) shall be plastic pipe for use with solvent weld or threaded fittings. Shall be manufactured rigid virgin polyvinyl chloride (PVC) 1220, Type 1, Grade 2 conforming to ASTM D 1785, designated as Schedule 40.
    b. Pipe 2 - 3 inch diameter shall be manufactured rigid virgin polyvinyl chloride (PVC),Type 1, Grade 2 conforming to ASTM D 1785, designated as bell gasket Class 315.
    c. Pipe larger than 3 inch diameter (typical of mainline) shall be manufactured rigid virgin polyvinyl chloride (PVC), Type 1, Grade 2 conforming to ASTM D 1785, designated as bell gasket Class 200 PVC.
3. Non pressure lateral line for piping downstream of remote control valves: plastic pipe for use with solvent weld or threaded fittings. Shall be manufactured rigid virgin polyvinyl chloride PVC 1220 (type 1, grade 2) conforming to ASTM d 1785, designated as Class 200, ¾" minimum size.

C. Galvanized pipe shall be used for above ground connections to, backflow prevention device assemblies, hose bibs, and booster pumps and as shown on the plans and details.

1. Pipe shall be hot dip galvanized continuous welded, seamless, Schedule 40 conforming to applicable current ASTM standards.

2.5 FITTINGS AND CONNECTIONS:

A. Polyvinyl chloride pipe fittings and connections: Type II, Grade 1, Schedule 40, high impact molded fittings, manufactured from virgin compounds as specified for piping tapered socket or molded thread type, suitable for either solvent weld or screwed connections. Machine threaded fittings and plastic saddle and flange fittings are not acceptable. Furnish fittings permanently marked with following information: nominal pipe size, type and schedule of material, and National Sanitation Foundation (NSF) seal of approval. PVC fittings shall conform to ASTM D2464 and D2466.

B. Brass pipe fittings, unions and connections: standard 125 pound class 85% red brass fittings and connections, IPS threaded.

C. PVC Schedule 80 threaded risers and nipples: Type I, grade 1, Schedule 80, high impact molded, manufactured from virgin compounds as specified for piping and conforming to ASTM D-2464. Threaded ends shall be molded threads only. Machined threads are not acceptable.

D. Galvanized pipe fittings shall be galvanized malleable iron ground joint Schedule 40 conforming to applicable current ASTM standards.

2.6 SOLVENT CEMENTS AND THREAD LUBRICANT

A. Solvent cements shall comply with ASTM D2564. Socket joints shall be made per recommended procedures for joining PVC plastic pipe and fittings with PVC solvent cement and primer by the pipe and fitting manufacturer and procedures outlined in the appendix of ASTM D2564.

B. Thread lubricant shall be Teflon ribbon-type, or approved equal, suitable for threaded installations as per manufacturer's recommendations.

C. Pipe Joint Compound (Pipe dope) shall be used on all galvanized threaded connections. Pipe Joint Compound is a white colored, non-separating thread sealant compound designed to seal threaded connections against leakage due to internal pressure. It shall contain PTFE (Polytetrafluoroethylene) to permit a tighter assembly with lower torque, secure permanent sealing of all threaded connections and allow for easy disassembly without stripping or damaging threads.

2.7 BACKFLOW PREVENTION DEVICES (not on project, as non-potable water is being used)

2.8 CHECK VALVES

A. Swing check valves 2 inch and smaller shall be 200 lbs., W.O.G., bronze construction with replaceable composition, neoprene or rubber disc and shall meet or exceed federal specification WW-V 5ld, class a, type iv.

B. Anti drain valves shall be of heavy duty virgin PVC construction with female iron pipe thread inlet and outlet. Internal parts shall be stainless steel and neoprene. Anti drain valves shall be field adjustable against draw out from 5 to 40 feet of head.

2.9 REMOTE CONTROL VALVES

A. Remote control valves shall be electrically operated, single seat, normally closed configuration, equipped with flow control adjustment and capability for manual operation.

B. Valves shall be actuated by a normally closed low wattage solenoid using 24 volts, 50/60 cycle solenoid power requirement. Solenoid shall be epoxy encased. A union shall be installed on the discharge end.

C. Remote control valves shall be wired to controller in same numerical sequence as indicated on drawings.

D. Remote control valves shall be as indicated on the drawings.

2.10 DRIP TUBING / DRIP SYSTEM / CONTROL VALVES

A. Rainbird XFDP or equal. All products are to be those expressed or implied on the Drawings.
B. All products must conform to their respective codes and regulations.

2.11 SPRINKLER HEADS

A. All sprinkler heads shall have check valves installed.

B. All sprinkler heads shall be as indicated on the drawings.

C. Riser nipples for all sprinkler heads shall be the same size as the riser opening in the sprinkler body and fabricated as shown on the drawings.

2.12 AUTOMATIC CONTROLLER + COMMUNICATION CARTRIDGE

A. Controller shall be housed in a plastic enclosure. Location is per drawings (interior). B. Automatic controller shall be as indicated on the drawings.

2.13 ELECTRICAL CONTROL WIRING

A. Low voltage

1. The electrical control wire shall be direct burial type UF, no. 14 AWG, solid, single conductor, copper wire UL approved or larger, if required to operate system as designed.
2. For 2-Wire controllers all irrigation wire for the controller, flow sensor, master valve, hydrometer, remote control valves and moisture sensors shall be per the controller manufacturer’s specifications and recommendations.
3. Color code wires to each valve. Common wire shall be white.
4. If multiple controllers are being utilized, and wire paths of different controllers cross each other, both common and control wires from each controller to be of different colors.
5. Control wire splices: Splices are when required shall be placed in splice boxes.
6. Wire connections shall be per the controller manufacturer’s specifications and recommendations.

B. High voltage

1. Shall be of type as required by local codes and ordinances.
2. Shall be of proper size to accommodate needs of equipment it is to serve.

2.14 VALVE BOXES AND MATERIALS

A. Valve boxes: valve boxes shall be constructed of ABS (acrylonitrile butadiene styrene) plastic, green in color, with rigid base and sides and shall be supplied with bolt lock cover secured with stainless steel bolts. Cover shall be identified with number of zone OR with value identification tag. Provide box extensions as required.
   1. Master valves, flow sensors, remote control irrigation valves, gate valves, and ball valves 3 inch or less in size shall use a 14 inch x 19 inch x 12 inch rectangular box.
   2. Quick coupler valves, wire splices, and grounding rods shall use a 10 inch circular box.
   3. Lettering: "VALVE BOX" or "IRRIGATION".

2.15 CONCRETE THRUST BLOCKS

A. Concrete thrust blocks shall be sized per the pipe manufacturer's requirement.

2.16 VALVE IDENTIFICATION TAGS

A. Valve Identification Tags shall be 2.25 inch x 2.65 inch polyurethane. Color: potable water; yellow / Non-potable water; purple. Tags shall be permanently attached to each remote control valve with tamper proof seals as indicated on the drawings.

2.17 EQUIPMENT TO BE FURNISHED TO OWNER

A. Two (2) sets of keys for each automatic controller.
B. Two (2) 48 inch tee wrenches for operating the gate valves.
C. Three (3) sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.
D. Five (5) Extra sprinkler heads, nozzles, shrub adapters, nozzle filter screens, for each type used on the project.
E. (If applicable) Two (2) quick coupler keys to match manufacturer type of quick coupler.

2.18 INCIDENTAL MATERIALS AND EQUIPMENT

A. Furnish all materials and equipment not specified above, but which are necessary for completion of the work as intended.

2.19 MAIN LINE LOCATOR TAPE

A. 3 - inch wide plastic detectable locator tape.

2.20 MAIN LINE AND LATERAL LINE BEDDING SAND

A. Sand shall consist of natural or manufactured granular material, free of organic

material, mica, loam, clay or other substances not suitable for the intended purpose.

B. Sand shall be masonry sand ASTM C 144 or coarse concrete sand, ASTM C 33.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Code requirements shall be those of state and municipal codes and regulations locally governing this work, providing that any requirements of the drawings and specifications, not conflicting therewith, but exceeding the code requirements, shall govern unless written permission to the contrary is granted by the ENGINEER.

B. Extreme care shall be exercised at all times by the CONTRACTOR in excavating and working in the project area due to existing utilities and irrigation systems to remain. CONTRACTOR shall be fully responsible for expenses incurred in the repair of damages caused by their operation.

1. The CONTRACTOR is responsible for identifying and maintaining existing irrigation main lines that supply water to areas on the site as noted on the drawings and outside of the proposed limit of work. The CONTRACTOR shall relocate or replace existing irrigation main line piping as required to maintain existing system.

C. Plan locations of backflow preventers, valves, controllers, irrigation lines, sleeves, spray heads and other equipment are diagrammatic and indicate the spacing and relative locations of all installations. Final site conditions and existing and proposed plantings shall determine final locations and adjusted as necessary and as directed to meet existing and proposed conditions and obtain complete water coverage. Minor changes in locations of the above from locations shown shall be made as necessary to avoid existing and proposed trees, piping, utilities, structures, etc. at the CONTRACTOR's expense or when directed by the ENGINEER. The CONTRACTOR shall remove and relocate such items at their expense if so directed by the ENGINEER.

D. Prior to any work the CONTRACTOR shall stake out locations of all pipe, valves, equipment and irrigation heads and emitters using an approved staking method and maintain the staking of the approved layout in accordance with the drawings and any required modifications. Verify all horizontal and vertical site dimensions prior to staking of heads. Do not exceed spacing shown on drawings for any given area. If such modified spacing demand additional or less material than shown on the drawings, notify the ENGINEER before beginning any work in the adjacent area.

E. Stub out main line at all end runs and as shown on drawings. Splice wires at existing clock location to extend to new clock *once the new clock is available and operational.*

F. Point of connection shall be approximately as shown on drawings. Connect new underground piping and valves and provide all flanges, adapters or other necessary fittings for connection.

G. Permission to shut off any existing in-use water line must be obtained 48 hours in advance, in writing from the Owner. The CONTRACTOR shall receive instructions from the ENGINEER as to the exact length of time of each shut-off.

H. No fittings shall be installed on pipe underneath pavement or walls.

I. Prior to starting any work, CONTRACTOR shall obtain a reading of existing static water pressure (no flow condition) at the designated point of connection and immediately submit written verification of pressure with date and time of recording to ENGINEER.

3.2 TRENCHING, DIRECTIONAL BORING AND SLEEVING

A. Perform all trenching, directional boring, sleeving and excavations as required for the installation of the work included under this section, including shoring of earth banks to prevent cave ins.

B. The CONTRACTOR may directional bore lines where it is practical or where required on the plans.
   1. Extend the bore 1 foot past the edge of pavement unless noted differently on the plans
   2. Cap ends of each bore and locate ends at finished grade using metal stakes.
   3. All boring and sleeving shall have detectable locator tape placed at the ends of the pipe.

C. Make trenches for mains, laterals and control wiring straight and true to grade and free of protruding stones, roots or other material that would prevent proper bedding of pipe or wire.

D. Excavate trenches wide enough to allow a minimum of 4 - inch between parallel pipelines and 8 inch from lines of other trades. Maintain 3 - inch vertical clearance between irrigation lines. Minimum transverse angle is 45 degrees. All pipes shall be able to be serviced or replaced without disturbing the other pipes.

E. Trenches for pipelines shall be made of sufficient depth to provide the minimum cover from finished grade as follows:
   1. Main line: 18 inches below finish grade and 24 inches below paved areas in Schedule 40 PVC sleeves.
   2. Irrigation (especially reclaimed) water constant pressure main lines shall cross at least twelve (12) inches below potable water lines. If installed above a potable water line or less than twelve (12) inches below a potable water line, then reclaimed water line shall be installed within an approved protective sleeve. The sleeve shall extend ten (10) feet from each side of the center of the potable line, for a total of twenty (20) feet.
   3. Lateral lines: 12 inches below finish grade and 18 inches below paved areas in Schedule 40 PVC sleeves.
   4. Control wiring: to the side of pressure main line in Schedule 40 PVC sleeves.

F. When trenching through areas of imported or modified soil, deposit imported or modified soils on one side of trench and subsoil on opposite side.

G. Backfill the trench per the requirements in paragraphs “Backfilling and Compacting” below.

3.3 PIPING INSTALLATION

A. General Pipe Installation

1. Exercise caution in handling, loading and storing, of plastic pipe and fittings to avoid damage.
   a. The pipe and fittings shall be stored under cover until using, and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not to be subjected to undue bending or concentrated external load at any point.
   b. All pipe that has been dented or damaged shall be discarded unless such dent or damaged section is cut out and pipe rejoined with a coupling.
2. Trench depth shall be as specified above from the finish grade to the top of the pipe.
3. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.

B. Polyvinyl Chloride Pipe (PVC) Installation

1. Under no circumstance is pipe to rest on concrete, rock, wood blocks, construction debris or similar items.
2. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.
3. No water shall be permitted in the pipe until a period of at least 24 hours has elapsed for solvent weld setting and curing.
4. Install assemblies and pipe to conform to respective details and where shown diagrammatically on drawings, using first class workmanship and best standard practices as approved. All fittings that are necessary for proper connections such as swing joints, offsets, and reducing bushings that are not shown on details shall be installed as necessary and directed as part of the work.
5. Dielectric bushings shall be used in any connections of dissimilar metals.
6. Gasketed plastic pipe: pipe-to-pipe joints or pipe to fittings shall be made in accordance with manufacturer’s specifications.
7. Solvent weld or threaded plastic pipe:
   a. Installation of all pipe and fittings shall be in strict accordance with manufacturer’s specifications.
   b. Pipe shall be cut using approved PVC pipe cutters only. Sawed joints are disallowed. All field cuts shall be beveled to remove burrs and excess before gluing.
   c. Welded joints shall be given a minimum of 15 minutes to set before moving or handling. Excess solvent on the exterior of the joint shall be wiped clean immediately after assembly.
   d. Plastic to metal connections shall be made with plastic adapters and if necessary, short (not close) brass threaded nipples. Connection shall be made with two (2) wraps of Teflon tape and hand tightened plus one turn with a strap wrench.
   e. Snake pipe horizontally in trench to allow one (1) foot of expansion and contraction per 100 feet of straight run.
   f. Threaded pipe joints shall be made using Teflon tape. Solvent shall not be used with threaded joints. Pipe shall be protected from tool damage

during assembly. All damaged pipe shall be removed and replaced. Take up threaded joints with light wrench pressure.

g. No close nipples or risers are allowed. Cross connections in piping is disallowed.

h. Center load pipe at 10 feet on center intervals with small amount of backfill to prevent arching and slipping under pressure. Other than this preliminary backfill all pipe joints, fittings and connections are to remain uncovered until successful completion of hydrostatic testing and written approval of the testing report.

i. Concrete thrust blocks shall be constructed behind all pipe fittings 1-1/2 inch diameter and larger at all changes of direction of 45 degrees or more.

j. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1) Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.

2) PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule- number PVC pipe and socket fittings according to ASTM D 2855.

3) PVC Nonpressure Piping: Join according to ASTM D 2855.

3.4 TRENCHING, DIRECTIONAL BORING, AND SLEEVING REVIEW:

A. Upon completion and installation of all trenching, directional boring, and sleeving, all installed irrigation control wiring, lines and fittings shall be visually observed by the ENGINEER unless otherwise authorized. Do not cover any wires, lines or fittings until they have been tested and observed by the ENGINEER.

3.5 FLUSHING

A. Openings in piping system during installation are to be capped or plugged to prevent dirt and debris from entering pipe and equipment. Remove plugs when necessary to flush or complete system.

B. After completion and prior to the installation of any terminal fittings, the entire pipeline system shall be thoroughly flushed to remove dirt, debris or other material.

3.6 HYDROSTATIC PRESSURE TESTING

A. After flushing, and the installation of valves the following tests shall be conducted in the sequence listed below. The CONTRACTOR shall furnish all equipment; materials and labor necessary to perform the tests and all tests shall be conducted in the presence of the ENGINEER.

B. Water pressure tests shall be performed on all pressure main lines before any couplings, fittings, valves and the like are concealed.

C. Immediately prior to testing, all irrigation lines shall be purged of all entrapped air or debris by adjusting control valves and installing temporary caps forcing water and debris to be discharged from a single outlet.

D. Test all pressure main line at 150 PSI for a minimum of four (4) hours with an allowable loss of 5 PSI. Pressure and gauges shall be read in PSI, and calibrated

such that accurate determination of potential pressure loss can be ascertained.

E. Re test as required until the system meets the requirements. Any leaks, which occur during test period, will be repaired immediately following the test. All pipe shall be re tested until final written acceptance.

F. The CONTRACTOR is responsible for proving documentation stating the weather conditions, date, the start time and initial water pressure readings, the finish time and final water pressure readings and the type of equipment used to perform the test. The documentation must be signed by a witness acceptable to the Owner, verifying all of the above-mentioned conditions.

G. Submit a written report of the pressure testing results with the other above required information to the ENGINEER for approval.

3.7 BACKFILLING AND COMPACTING

A. Irrigation trenches shall be carefully backfilled with material approved for backfilling and free of rocks and debris one (1) inch in diameter and larger. When back filling trenches in areas of imported or modified planting soil, replace any excavated subsoil at the bottom and the imported soil or modified planting soil at the top of the trench.

B. Backfill shall be compacted with approved equipment to the following densities
   1. Backfill under pavement and within 2 feet of the edge of pavement: Compact to 95% or greater of maximum dry density standard proctor.
   2. Backfill of subsoil under imported planting mixes or modified existing planting soil: Between 85 and 90% of maximum dry density standard proctor.
   3. Backfill of imported planting mixes or modified existing planting soil: Compact to the requirements of the adjacent planting mix or planting soil as specified in section “Planting Soil”.

C. Finish grade of all trenches shall conform to adjacent grades without dips or other irregularities. Dispose of excess soil or debris off site at CONTRACTOR's expense.

D. Any settling of backfill material during the maintenance or warranty period shall be repaired at the CONTRACTOR’s expense, including any replacement or repair of soil, lawn, and plant material or paving surface.

3.8 RESURFACING PAVING OVER TRENCHES

A. Restore all surfaces and repair existing underground installations damaged or cut as a result of the excavation to their original condition, satisfactory to the ENGINEER.

B. Trenches through paved areas shall be resurfaced with same materials quality and thickness as existing material. Paving restoration shall be performed by the project paving Sub-CONTRACTOR or an approved CONTRACTOR skilled in paving work.

C. The cost of all paving restoration work shall be the responsibility of the irrigation CONTRACTOR unless the trenching thru the paving was, by previous agreement, part of the general project related construction.

3.9 INSTALLATION OF EQUIPMENT

A. General:

1. All equipment shall be installed to meet all installation requirements of the product manufacturer. In the event that the manufactures requirements cannot be implemented due to particular condition at the site or with other parts of the design, obtain the ENGINEER's written authorization and approval for any modifications.
2. Install all equipment at the approximately at the location(s) and as designated and detailed on the drawings. Verify all locations with the ENGINEER.
3. Install all valves within a valve box of sufficient size to accommodate the installation and servicing of the equipment. Group valves together where practical and locate in shrub planting areas.
4. All sprinkler irrigation systems that are using water from potable water systems shall require backflow prevention. All backflow prevention devices shall meet and be installed in accordance with requirements set forth by local codes and the health department. This water is from the stormwater ponds, so backflow prevention is not anticipated.

B. Pressure regulator:

1. Set regulator for required PSI per manufacturer's specifications.

C. Check Valve:

1. Install check valves approximately at the locations necessary to prevent low head run off.

D. Remote control valves:

1. Install one remote control valve per valve box.
2. Remote control valve manifolds and quick coupler valves shall be separate allowing use of a quick coupler with all remote control valves shut off.
3. Install boxes no farther than 12 inches from edge of paving and perpendicular to edge of paving and parallel to each other. Allow 12 inches clearance between adjacent valve boxes.

E. Quick coupler valve:

1. Install each quick coupler valve in its own valve box.
2. Install thrust blocks on quick couplers.
3. Place no closer than 12 inches to adjacent paving.
4. Install 18 inches off set from main line.

F. Sprinkler heads:

1. All main lines and lateral lines, including risers, shall be flushed and pressure tested before installing sprinkler heads.
2. Install specified sprinkler heads as shown in details at locations shown on the drawings. Adjust layout for full coverage, spacing of heads shall not exceed the maximum spacing recommended by the manufacturer.
3. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.
4. All sprinkler heads shall be set perpendicular to finish grade unless otherwise designated on the drawings or details.

G. Irrigation controllers:
1. Remote control valves shall be connected to controller in numerical sequence as shown on the drawings.
2. Controller shall be tested with complete electrical connections. The CONTRACTOR shall be responsible for temporary power to the controller for operation and testing purposes.
3. Connections to control wiring shall be made within the pedestal of the controller. All wire shall follow the pressure main insofar as possible.
4. Electrical wiring shall be in a rigid gray PVC plastic conduit from controller to electrical outlet. The electrical CONTRACTOR shall be responsible for installing all wiring to the controller, in order to complete this installation. A disconnect switch shall be included.
5. Equipment Mounting: Install interior controllers on wall in location shown on drawings.
   a. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   b. Install anchor bolts to elevations required for proper attachment to supported equipment.

H. Wiring:
1. Low Voltage
   a. Control wiring between controller and electrical valves shall be installed in the same trench as the main line where practical. The wire shall be bundled and secured to the lower quadrant of the trench at 10 foot intervals with plastic electrical tape.
   b. When the control wiring cannot be installed in the same main line trench it shall be installed a minimum of 18 inches below finish grade and a bright colored plastic ribbon with suitable markings shall be installed in the trench 6 inches below grade directly over the wire.
   c. An expansion loop shall be provided every 500 feet in a box and inside each valve box. Expansion loop shall be formed by wrapping wire at least eight (8) times around a ¾ inch pipe and withdrawing pipe.
   d. Provide one control wire to service each valve in system.
   e. Run two (2) spare #14 1 wires from controller along entire main line to last electric remote control valve on each and every leg of main line. Label spare wires at controller and wire stub to be located in a box.
   f. All control wire splices not occurring at control valve shall be installed in a separate splice valve box.
   g. Wire markers (sealed, 1 inch to 3 inch square) are to identify control wires at valves and at terminal strips of controller. At the terminal strip mark each wire clearly indicting valve circuit number.
2. High Voltage
   a. All electrical work shall conform to local codes, ordinances and any authorities having jurisdiction. All high voltage electrical work to be performed by licensed electrician.
   b. The CONTRACTOR shall provide 120-volt power connection to the automatic controller unless noted otherwise on drawings.

I. Valve boxes:
1. Install one valve box for each type of valve installed as per the details.
2. Gravel sump shall be installed after compaction of all trenches. Final

portion of gravel shall be placed inside valve box after valve is backfilled and compacted.

3. Permanently label valve number and or controller letter on top of valve box lid using a method approved by the Owners Representative.

J. Tracer wire:

1. Tracer wire shall be installed with non metallic plastic irrigation main lines where controller wires are not buried in the same trench as the main line.
2. The tracer wire shall be placed on the bottom of the trench under the vertical projection of the pipe with spliced joints soldered and covered with insulation type tape.
3. Tracer wire shall be of a color not used for valve wiring. Terminate wire in a valve box. Provide enough length of wire to make a loop and attach wire marker with the designation "tracer wire".

K. Drip Installation:

1. Clamp fittings with Oetiker clamps or approved equal when operating pressure exceeds specific drip tubing fitting requirements.
2. When installing drip tubing, install soil staples as listed below:
   a. Sandy Soil - One staple every three (3') feet and two (2) staples on each change of direction (tee, elbow, or cross).
3. Cap or plug all openings as soon as lines have been installed to prevent the intrusion of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
4. Thoroughly flush all water lines before installing valves and other hydrants.

3.10 IDENTIFICATION

A. Identify system components.

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches.

3.11 ADJUSTMENT AND COVERAGE TEST

A. Adjustment:

1. The CONTRACTOR shall flush and adjust all sprinkler heads, valves and all other equipment to ascertain that they function according to the manufacturer's data.
2. Adjust all sprinkler heads not to overspray onto walks, roadways and buildings when under maximum operating pressure and during times of normal prevailing winds.

B. Coverage test:

1. The CONTRACTOR shall perform the coverage test in the presence of the ENGINEER after all sprinkler heads have been installed, flushed

and adjusted. Each section is tested to demonstrate uniform and adequate coverage of the planting areas serviced.

2. Any systems that require adjustments for full and even coverage shall be done by the CONTRACTOR prior to final acceptance at the direction of the ENGINEER at no additional cost. Adjustments may also include realignment of pipes, addition of extra heads, and changes in nozzle type or size.
3. The CONTRACTOR at no additional cost shall immediately correct all unauthorized changes or improper installation practices.
4. The entire irrigation system shall be operating properly with written approval of the installation by the ENGINEER prior to beginning any planting operations.

3.12 REPAIR OF PLANTING SOIL

A. Any areas of planting soil including imported or existing soils or modified planting soil which become compacted or disturbed or degraded as a result of the installation of the irrigation system shall be restored to the specified quality and compaction prior to beginning planting operations at no additional expense to the Owner. Restoration methods and depth of compaction remediation shall be approved by the ENGINEER.

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 property.

B. Once installation is complete, wash all soil from pavements and other structures.
   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 soil, packaging, and other material brought to the site by the CONTRACTOR.

3.14 PROTECTION

A. The CONTRACTOR shall protect installed irrigation work from damage due to operations by other CONTRACTORs or trespassers.
   1. Maintain protection during installation until Acceptance. Treat, repair or replace damaged work immediately. The ENGINEER shall determine when such treatment, replacement or repair is satisfactory.

3.15 PRE MAINTENANCE OBSERVATION:

A. Once the entire system shall be completely installed and operational and all planting is installed, the ENGINEER shall observe the system and prepare a written punch list indicating all items to be corrected and the beginning date of the maintenance period.

B. This is not final acceptance and does not relieve the CONTRACTOR from any of

the responsibilities in the contract documents.

3.16 GENERAL MAINTENANCE AND THE MAINTENANCE PERIOD

A. General maintenance shall begin immediately after installation of irrigation system. The general maintenance and the maintenance period shall include the following:
   1. On a weekly basis the CONTRACTOR shall keep the irrigation system in good running order and make observations on the entire system for proper operation and coverage. Repair and cleaning shall be done to keep the system in full operation.
   2. Records of all timing changes to control valves from initial installation to time of final acceptance shall be kept and turned over to the ENGINEER at the time of final acceptance.
   3. During the last week of the maintenance period, provide equipment familiarization and instruction on the total operations of the system to the personnel who will assume responsibility for running the irrigation system.
   4. At the end of the maintenance period, turn over all operations logs, manuals, instructions, schedules, keys and any other equipment necessary for operation of the irrigation system to the ENGINEER who will assume responsibility for the operations and maintenance of the irrigation system.

B. The maintenance period for the irrigation system shall coincide with the maintenance period for the Planting. (See specification section 329300 Plants and Section 329200 Turf and Grasses.)

3.17 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the CONTRACTOR, the ENGINEER shall review the work and make a determination if the work is substantially complete.

B. The date of substantial completion of the irrigation shall be the date when the ENGINEER accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.

3.18 FINAL ACCEPTANCE / SYSTEM MALFUNCTION CORRECTIONS

A. At the end of the Plant Warrantee and Maintenance period, (See specification section “Planting”) the ENGINEER shall inspect the irrigation work and establish that all provisions of the irrigation system are complete and the system is working correctly.
   1. Restore any soil settlement over trenches and other parts of the irrigation system.
   2. Replace, repair or reset any malfunctioning parts of the irrigation system.

B. The CONTRACTOR shall show all corrections made from punch list. Any items deemed not acceptable shall be reworked and the maintenance period will be extended.

C. The CONTRACTOR shall show evidence that the ENGINEER has received all charts, records, drawings, and extra equipment as required before final acceptance.

D. Failure to pass review: If the work fails to pass final review, 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 reviewer.

END OF SECTION 32 84 00

The basis of payment for **Irrigation** is LUMP SUM.

Item 71 **Mitigation Planting:**

The bid price for this item shall include, but not be limited to, the necessary manpower, equipment, materials and plantings required to place wetland type vegetation at the proposed and mitigation pond, and at the wetland area at the southwest corner of the project area, as required by the St. Johns River Water Management District (SJRWMD) and as indicated in the construction plans.

Once SJRWMD finalizes mitigation requirements for the project, the CONTRACTOR shall submit a mitigation planting plan to the ENGINEER for approval.

The basis of payment for **Mitigation Planting** is LUMP SUM.