EXHIBIT 1

WALTERS ZACKRIA
ARCHITECTS

pompano beach
Florida's Warmest Welcome

CITY OF POMPANO BEACH
CHARLOTTE BURRIE PLAZA & PASSIVE PARK

PROJECT SPECIFICATIONS

2669 N FEDERAL HWY,
POMPANO BEACH, FLORIDA 33064

Architect's Project #2203
April 11, 2025

CITY OF POMPANO BEACH PROJECT NO. 22-135

Construction for this project shall comply with the Florida Building Code 2020, Seventh Edition with latest revisions, and the Florida Prevention Code 2020, Seventh Edition with latest revisions.

CITY OF POMPANO BEACH
CHARLOTTE BURRIE PLAZA & PASSIVE PARK

SPECIFICATIONS MANUAL - DIVISIONS 1 TO 9
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SECTION 01010 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Requirements and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Project Information
2. Work covered by the Contract Documents
3. Type of Contract
4. Existing Conditions
5. Limits of Construction
6. Coordination of Work
7. Cooperation Between Contractors
8. Work Hours and Daily Cleanup
9. Time for Performance
10. Discrepancies, Interpretation and Omissions
11. Permits and Fees
12. Job Site Visitation
13. Pre-Construction Meeting
14. Regulatory Requirements
15. Specification Formats and Conventions
16. Definitions

B. Related Sections include the following:

1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. City of Pompano Beach's General Conditions.

1.3 PROJECT INFORMATION

A. Project Identification: Charlotte Burrie Plaza & Passive Park

B. Project Location: 2669 N Federal Hwy, Pompano Beach, FL 33064

C. Owner: City of Pompano Beach
1. Owner's Representative: Hector Gandia, Engineering Project Manager
City of Pompano Beach
1201 NE 5th Ave.
Pompano Beach, FL 33060
Office: 954-786-5520
Hector.Gandia@copbfl.com

D. Architect: Walters Zackria Associates, PLLC

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work generally includes Construction of the following items, as defined in the Construction documents:
   1. Clearing existing parcel of land.
   2. Removing & relocating existing trees.
   3. Removing & relocating existing fence and gates.
   4. Removing existing bollards.
   5. Removing 4 parking stalls striping in the existing Community Center parking lot.
   6. New Park entry sign.
   7. New asphalt driveway and parking lot with concrete curbs and landscape islands.
   8. New aluminum picket fence, vehicular and pedestrian gates.
   9. New plaza, stage, pedestrian walkway and play area.
   10. New metal canopies, shade structure and pavilion shelter.
   11. New site lighting.
   12. New site furniture and surface finishes.
   13. New sidewalk from park connecting to existing sidewalk in the Community Center parking lot.
   14. New underground utilities.
   15. New landscape and irrigation.

1.5 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.6 EXISTING CONDITIONS

A. The Charlotte Burrie Community Center is currently in use. The Contractor is required to perform the needed construction work in a way that does not disturb the function or interrupt ongoing operations of the Community Center. The Contractor is to maintain access to the FPL station from NE 16th Ave. All work must be coordinated and scheduled with approval from the Owner's Representative. The areas not covered by the work must be protected. Any areas damaged or disturbed by the construction effort in any way must be repaired and brought to the condition found just prior to the construction. All repairs must be done by the Contractor as part of this contract and to the complete satisfaction of the Owner. A piece of land in the northwest corner of the parcel belongs to Broward County; refer to construction documents for limits of work and installation of new fence.

B. Refer to City of Pompano Beach's General Conditions for Protection of Work & Materials requirements.

1.7 LIMITS OF CONSTRUCTION

A. The work set forth in the Contract Documents will be performed within the limits established in the site plan. Contractor shall not work outside of the limits without requesting authorization in writing and receiving written approval.

1.8 COORDINATION OF WORK

A. The Contractor shall be responsible for the planning and scheduling, and coordination of all Work performed under the contract, so that materials will arrive on schedule and installation will proceed without delay.

B. Coordinate scheduling, construction documents, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence and installation of interdependent construction elements.

C. Verify that the utility requirement characteristics of operating equipment are compatible with available utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements and installation of Work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable. Utilize spaces efficiently to maximize for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate Sections in preparation for Substantial Completion.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with the Contract Documents, to minimize disruption of Owner's activities.

H. Construction Documents: Contractor shall provide entire set of Construction Documents (drawings and specifications) to all subcontractors and suppliers.

1.9 COOPERATION BETWEEN CONTRACTORS

A. One or more contracts may be required to construct the project. When separate contracts are awarded for different portions of the project, the Contractor in each case shall be the person other than the City who signs each separate contract.

B. The City reserves the right to contract for and perform other or additional construction on or near the Work covered by this Contract.

C. When separate contracts are let within or near the limits of the Project, the Contractor shall conduct its Work so as not to interfere with or hinder the progress of completion of the construction performed by other Contractors. Contractors working on the same Project shall cooperate with each other as directed by the City.

D. The Contractor shall assume all liability, financial or otherwise, in connection with this Contract and shall protect and save harmless the City from any and all damages or claims.

E. The Contractor shall arrange its Work and shall place or dispose of the materials being used as not to interfere with the operations of the other Contractors within or near the limits of the Project. The Contractor shall join its work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

1.10 WORK HOURS AND DAILY CLEANUP

A. On-Site Work Hours: Work shall be performed during normal business hours from 8:00 a.m. to 5:00 p.m., Monday through Friday, except otherwise indicated. No work is allowed after normal business hours or on weekends without prior permission from the owner. In addition, work shall not be allowed to start before:

1. The contractor obtains a Building Permit from the Building Division having jurisdiction at this location.
2. The contractor coordinates with the Building Division for all required inspections.
3. The contractor protects users of the Community Center and other adjacent areas.

1.11 TIME FOR PERFORMANCE

A. The work to be performed under this Contract shall be commenced upon issuance of A Notice to Proceed, which will not be issued until receipt of all required documents.

B. Time is of the essence for this Contract. The work shall be completed within One Hundred and Eighty (180) calendar days from the Project Initiation Date specified in the Notice to Proceed.

C. Refer to City of Pompano Beach's General Conditions for amount to be paid by Contractor to Owner upon failure of the Contractor to complete a project awarded pursuant to this contract within the specified time (plus approved extensions if any). This amount is not a penalty but liquidated damages to the Owner. Liquidated damages are hereby fixed and agreed upon between the parties, recognizing the impossibility of precisely ascertaining the amount of damages that will be sustained by the Owner as a consequence of such delay. Contractor acknowledges and agrees that damages to Owner from untimely completion are extremely difficult to determine, and accordingly the Contractor agrees that the amount of liquidated damages provided for in the General Conditions is the nearest and most exact measure of damages for such delays.

1. Contractor shall also pay for all additional Consultant Fees incurred by the Owner for Contractor delays.

1.12 DISCREPANCIES, INTERPRETATION AND OMISSIONS

A. Contractor shall bring any apparent discrepancies to the attention of the City and Architect for resolution prior to commencing with the Work. Contractor shall use a Request for Information (RFI) form to communicate discrepancies and receive direction.

B. Should conflict occur between the Code requirements, Plans, or Specifications, the Contractor is deemed to have based the bid upon the more expensive method of performing the Work and the most rigid requirements shall apply provided they are not in conflict with the Florida Building Code.

1.13 PERMITS AND FEES

A. Contractor shall be responsible for obtaining required permits from all authorities having jurisdiction.

B. Any permit fees to non-city agencies will be paid by the Contractor. The City will pay for all permit fees to City Agencies. Contractor is responsible for all failed inspection fees.

C. Contractor is required to maintain all permits in an active status. Any permit that expires shall be reactivated by the contractor at no additional cost to the owner.

1.14 JOB SITE VISITATION

A. Job site visitation is mandatory, submission of a Bid will be construed that the Bidder is acquainted sufficiently with the work to be performed. For access to the site, contact:
Hector Gandia, Engineering Project Manager

City of Pompano Beach
1201 NE 5th Ave.
Pompano Beach, FL 33060
Office: 954-786-5520
Hector.Gandia@copbfl.com

1.15 PRE-CONSTRUCTION MEETING

A. The Owner will schedule and administer a conference to be attended by the Contractor and the Owner's Construction Manager to discuss official Notice to Proceed date, coordination, schedules, submittals and related matters.

1.16 REGULATORY REQUIREMENTS

A. The following codes are to be considered an integral part of the Project Manual:

1. Florida Building Code, Seventh Edition – 2020, with latest revisions.
2. Florida Fire Prevention Code, Seventh Edition, with latest revisions.
3. National Electric Code – 2020 edition.
4. ASCE 7-16
5. OSHA safety standards.

B. All work for this project shall conform to the above codes and to the requirements of any regulatory authority having jurisdiction.

1.17 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.18 DEFINITIONS

A. Refer to City of Pompano Beach's General Conditions for list of Definitions.

B. **Products**: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the work. Products may also include existing materials or components required for reuse.

C. **Furnish**: To supply and deliver, unload, inspect for damage (same as supply).

D. **Install**: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use.

E. **Provide**: To furnish or supply, plus install.

F. **Supply**: To supply and deliver, unload, inspect for damage (same as furnish).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01010

SECTION 01020 – ALLOWANCES

PART 1 - GENERAL

1.1 PERMIT ALLOWANCE (Bid Item No. 20)

A. Included in the TOTAL BASE BID AMOUNT is the sum of Twenty thousand dollars ($20,000.00) for obtaining building permits, inspections and certificates of completion required by the State of Florida, any State Agencies, or by other local governmental entities including the City of Pompano Beach.

B. Permit fees payable under this allowance shall be limited to the actual cost of the permits only.

C. Fees excluded from this allowance include but are not limited to re-inspection fees, expired permit fees, and contractor's overhead and profit. These costs should be included elsewhere in the Bid.

1.2 OWNER'S CONTINGENCY ALLOWANCE (Bid Item No. 21)

A. The Allowance for Bid Item 21 shall be used for Owner directed contract changes.

B. Included in the TOTAL BASE BID AMOUNT is the sum of One Hundred thousand dollars ($100,000.00) for owner directed modifications and approved increases to Contractor's scope of work.

C. Payment under this allowance shall be made to the Contractor for only approved change orders.

D. Payment under this allowance shall be limited to the actual cost plus 5% mark-up applied to the total amount of labor, Materials and equipment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01020

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 EXPLANATION AND DEFINITIONS

A. The following explanation of the Measurement and Payment for the bid form items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the bid form or relieve the Contractor of the necessity of furnishing such as part of the Contract.

1.2 PAYMENT

A. Payment shall be made for the items listed on the Bid Form on the basis of the work actually performed and completed, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, clean up, and all other appurtenances to complete the construction and installation of the work to the configuration and extent as shown on the drawings and described in the specifications.

B. It is intended that all mobilization, license and other miscellaneous administrative costs, and all other costs to the Contractor not specifically identified in the following item description be distributed among and included in the unit prices stated. No additional payment shall be made for transportation, communications, office maintenance, project signs, and other incidental work or services, and no further payment shall be made for remobilization unless all of the work is suspended by the Owner for a period in excess of three months and through no fault to the Contractor.

C. All required manufacturer testing, and certification shall be included in the unit prices shown in the Bid Form. Passing results for testing required for concrete strength and materials testing required at the time of construction shall be arranged for by Contractor and paid for by the Contractor.

PART 2 - MATERIALS

NOT USED

PART 3 - EXECUTION

3.1 MOBILIZATION (Bid item no. 1)

A. Measurement for payment will include all expenses not specifically listed below but required by the contract documents and specifications, such as temporary fencing, erosion and pollution controls, storage containers, signage, etc.

B. Payment will be based upon the lump sum price and paid as a percentage completed, upon verification by the Owner’s Designee.

3.2 INSURANCE PAYMENT BOND, PERFORMANCE BOND (Bid Item No. 2)

A. Measurement for payment will include all expenses related to Insurance Payment Bond, Performance Bond, etc. required by the contract documents and specifications.

B. Payment will be based upon the lump sum price for the Insurance Payment Bond, Performance bond**.**

3.3 GENERAL CONDITIONS (Bid item no. 3)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as supervision, project management, temporary utilities, temporary fencing, shoring, and permits, material testing and special inspections, etc.

B. Payment will be based upon the lump sum price for the General Conditions divided in equal payments over the contract duration, upon verification by the Owner's Designee.

3.4 DEMOLITION (Bid item no. 4)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as demolition of existing asphalt, fence, bollards, etc.

B. Payment will be based upon the lump sum price and paid as a percentage completed, upon verification by the Owner's Designee.

3.5 SITE PREPARATION (Bid Item No. 5)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as tree protection, clear & grubbing, trench & excavation, grading, etc.

B. Payment will be based upon the lump sum price for Site Preparation paid as a percentage completed, upon verification by the Owner's Designee.

3.6 FIELD SURVEYING (Bid Item No. 6)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as as-builts for water, sewer, finish grade, site features, etc.

B. Payment will be based upon the lump sum price for Field Surveying paid as a percentage completed, upon verification by the Owner's Designee.

3.7 PARKING LOT & ASPHALT DRIVEWAY (Bid Item No. 7)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as asphalt driveway & parking lot, striping, etc.

B. Payment will be based upon the lump sum price for the Parking lot & Asphalt driveway paid as a percentage completed, upon verification by the Owner's Designee.

3.8 CONCRETE SIDEWALK, CURB, RAMP, STAGE, BENCH (Bid Item No. 8)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as construction of concrete sidewalk within project extents, concrete curbs, ramps, stage, plaza bench, etc.

B. Payment will be based upon the lump sum price for the Concrete sidewalk, Curb, Ramp, Stage, Bench paid as a percentage completed, upon verification by the Owner's Designee.

3.9 PAVERS (Bid Item No. 9)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as purchase and installation of paver, sub-base, curb, etc.

B. Payment will be based upon the lump sum price for the Pavers paid as a percentage completed, upon verification by the Owner's Designee.

3.10 METAL CANOPY SHELTERS (Bid Item No. 10)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as fabrication and installation of 3 metal canopies in the plaza, foundation, etc.

B. Payment will be based upon the lump sum price for the Metal Canopy Shelters paid as a percentage completed, upon verification by the Owner's Designee.

3.11 SHADE STRUCTURE (Bid Item No. 11)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as fabrication and installation of shade sail structures with foundations, etc.

B. Payment will be based upon the lump sum price for the Shade structure paid as a percentage completed, upon verification by the Owner's Designee.

3.12 SYNTHETIC TURF SURFACING (Bid Item No. 12)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as purchase and installation of synthetic turf, sub-base, foam pad, etc.

B. Payment will be based upon the lump sum price for the Synthetic turf surfacing paid as a percentage completed, upon verification by the Owner's Designee.

3.13 PAVILION SHELTER (Bid Item No. 13)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as pavilion shelter, foundations, etc.

B. Payment will be based upon the lump sum price for the Pavilion Shelter paid as a percentage completed, upon verification by the Owner's Designee.

3.14 FENCE & GATES (Bid Item No. 14)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as fabrication and installation of Chain-Link fence and gates with foundations, etc.

Payment will be based upon the lump sum price for the Chain-link Fence & Gates paid as a percentage completed, upon verification by the Owner's Designee.

B. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as fabrication and installation of Metal picket fence and gates with foundations, etc.

Payment will be based upon the lump sum price for the Aluminum Picket Fence & Gates paid as a percentage completed, upon verification by the Owner's Designee.

3.15 SITE LIGHTING & POWER (Bid Item No. 15)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as purchase and installation of site pedestrian light poles, light fixtures for parking lot, walkway light bollards, etc.

B. Payment will be based upon the lump sum price for the Site lighting & Power paid as a percentage completed, upon verification by the Owner's Designee.

3.16 LANDSCAPE & IRRIGATION (Bid Item No. 16)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as tree relocation, new landscape, sodding, irrigation system, etc.

B. Payment will be based upon the lump sum price for the Landscape & Irrigation paid as a percentage completed, upon verification by the Owner's Designee.

3.17 UNDERGROUND UTILITIES (Bid Item No. 17)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as capping/abandoning existing unused utilities, new water system, sewer system, drainage system, etc.

B. Payment will be based upon the lump sum price for the Underground Utilities paid as a percentage completed, upon verification by the Owner's Designee.

3.18 PARK SIGN, FURNITURE AND SIGNAGES (Bid Item No. 18)

A. Measurement for payment will include all expenses not specifically listed below but required by the construction documents and specifications, such as park monument sign, site furniture, traffic signage, park signage, etc.

B. Payment will be based upon the lump sum price for the Park Sign, Furniture & Signages paid as a percentage completed, upon verification by the Owner's Designee.

3.19 MISCELLANEOUS ITEMS NOT COVERED BY OTHER SECTIONS (Bid Item No. 19)

A. Measurement for payment will include all expenses not specifically listed in other sections but required by the construction documents and specifications.

B. Payment will be based upon the lump sum price for this work paid as percentage completed, upon verification by the Owner's Designee.

3.20 PERMIT ALLOWANCE (Bid item no. 20)

A. Included in the TOTAL BASE BID AMOUNT is the sum of Fifty thousand dollars ($20,000.00) for obtaining building permits, inspections and certificates of completion required by the State of Florida, State Agencies, or by other local governmental entities. See specification section 01020.

B. Fees excluded from this allowance include but are not limited to re-inspection fees, expired permit fees, and contractor's overhead and profit. These costs should be included elsewhere in the Bid.

C. Payment under the allowance item shall be made only for the actual cost of the permits. Payment against the lump sum for each permit shall be included under the appropriate item in the approved Application for Payment.

3.21 OWNER'S CONTINGENCY ALLOWANCE (Bid Item No. 21)

A. The Allowance shall be used for Owner directed contract changes.

B. See specification section 01020.

3.22 INDEMNIFICATION (Bid item no. 22)

A. Bidder must state the amount of consideration required by the Bidder in return for the Bidder's promise of Indemnity contained in the GENERAL CONDITIONS. The amount stated shall be no less than $10.00. Payment will be based upon the lump sum price.

END OF SECTION

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division l Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination Drawings.
2. Administrative and supervisory personnel.
3. Project meetings.
4. Requests for Interpretation (RFIs).

B. Related Sections include the following:

1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors or subcontractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
   a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   b. Indicate required installation sequences.
   c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Owner’s Designee for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
3. Number of Copies: Submit **pdf** copies of each submittal. Mark up and retain the returned copy as a Project Record Drawing. The owner requires one pdf copy only.
4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

B. Key Personnel Names: At the pre-construction conference, submit a list of key personnel assignments, including full time superintendent, full time project manager, and other personnel responsible for the project. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide resumes, list of project completed with similar scope in the last three years, and references with contact information for each individual.

1. Key personnel shall be full time employees of the company contracted with the Owner.

2. Any individual not acceptable shall be replaced someone satisfactory to the Owner and Owner's Designee.
    a. The Owner's Designee or Owner may require replacement of supervisory individuals for poor performance and management, quality control problems, project delays, lack of oversight, etc. The contractor shall comply with such request within 5 working days.
    b. The Contractor shall provide independently certified background checks, if required, to comply with state and local regulations. Any individual who does not pass the mandated requirements shall be removed immediately and replaced with someone with a clean background.
3. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
4. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

C. Refer to General Requirements for additional requirements.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Owner's Designee of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Owner's Designee, within **three** days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Owner's Designee. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Owner's Designee, and their consultants; Contractor and its superintendent; project manager; major subcontractors; suppliers; and other parties concerned shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
    a. Tentative construction schedule.
    b. Critical work sequencing and long-lead items.
    c. Designation of key personnel and their duties.
    d. Procedures for processing field decisions and Change Orders.
    e. Procedures for RFIs.
    f. Procedures for testing and inspecting.
    g. Procedures for processing Applications for Payment.
    h. Distribution of the Contract Documents.
    i. Submittal procedures.
    j. Preparation of Record Documents.
    k. Responsibility for temporary facilities and controls.
    l. Construction waste management and recycling.
    m. Office, work, and storage areas.
    n. Equipment deliveries and priorities.
    o. First aid.
    p. Security.
    q. Progress cleaning.
    r. Working hours.

3. Minutes: Record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner's Designee of scheduled meeting dates.
2. Agenda: Review of the progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    a. The Contract Documents.
    b. Related RFIs.
    c. Related Change Orders.
    d. Submittals.
    e. Review of mockups.
    f. Possible conflicts.
    g. Time schedules.
    h. Weather limitations.
    i. Manufacturer's written recommendations.
    j. Warranty requirements.
    k. Acceptability of substrates.
    l. Temporary facilities and controls.
    m. Regulations of authorities having jurisdiction.
    n. Testing and inspecting requirements.
    o. Installation procedures.
    p. Coordination with other work.
    q. Required performance results.
    r. Protection of adjacent work.
    s. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Owner's Designee, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule

revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review the present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Hazards and risks.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) RFIs.
15) Pending changes.
16) Status of Change Orders.
17) Documentation of information for payment requests.

3. Minutes: Record the meeting minutes.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Owner’s Designee.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.

9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

    a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Hard-Copy RFIs: CSI Form 13.2A.
1. Identify each page of attachments with the RFI number and sequential page number.

D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
1. RFIs shall be electronic files in Microsoft Word Document Format.
2. Attachments shall be electronic files in Adobe Acrobat PDF format.

E. Owner's Designee's Action: Owner's Designee will review each RFI, determine action required, and return it. Allow **seven** working days for Owner's Designee's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for coordination information already indicated in the Contract Documents.
   d. Requests for adjustments in the Contract Time or the Contract Sum.
   e. Requests for interpretation of Owner's Designee's actions on submittals.
   f. Incomplete RFIs or RFIs with numerous errors.

2. Owner's Designee's action may include a request for additional information, in which case Owner's Designee's time for response will start again.

3. Owner's Designee's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Order.
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owner's Designee in writing within **10** days of receipt of the RFI response.

F. On receipt of Owner's Designee's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Owner's Designee within **seven** days if Contractor disagrees with response.

G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Use CSI Log Form 13.2B. Include the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Owner's Designee.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Owner's Designee's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division l Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Preliminary Construction Schedule.
   2. Contractor's Construction Schedule.
   3. Submittals Schedule.
   4. Daily Construction Reports.
   5. Weekly Progress Reports.
   6. Material Location Reports.
   7. Field Condition Reports.
   8. Special Reports.

B. Related Sections include the following:
   1. Division 1 Section "Summary" for work sequence and Owner’s Occupancy.
   2. Division 1 Section "Payment Procedures" for application for payment and schedule of values.
   3. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
   4. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
   5. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Owner’s Designee.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.
   1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
   2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
   3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

H. Major Area: A story of construction, a separate building, or a similar significant construction element.

I. Milestone: A key or critical point in time for reference or measurement.

J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

A. Qualification Data: For scheduling consultant.

B. Submittals Schedule: Submit PDF copy of the schedule to Owner and Owner’s Designee for review. Arrange the following information in a tabular format:
   1. Scheduled date for first submittal.
   2. Specification Section number and title.
   3. Submittal category (action or informational).
   4. Name of subcontractor.
   5. Description of the Work covered.
   6. Scheduled date for Owner’s Designee's final release or approval.

C. Contractor's Construction Schedule: Submit PDF copy of the initial schedule, large enough to show entire schedule for entire construction period within first 14 days of the Notice of Proceed.
   1. Submit an electronic copy of schedule, using software indicated, in ZIP File, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

D. CPM Reports: Concurrent with CPM schedule, submit four copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
   1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
   2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
   3. Total Float Report: List of all activities sorted in ascending order of total float.

E. Daily Construction Reports: Submit one copy with every Weekly Progress Reports. Make reports immediately available on site to the Project Consultant, Owner and other jurisdictional authorities.

F. Weekly Progress Reports: Submit one copy of "Weekly Progress Report" with corresponding Daily Construction Reports to the Project Consultant at the end of each week.

G. Material Location Reports: Submit one copy at monthly intervals.

H. Field Condition Reports: Submit one copy at the time of discovery of differing conditions.

I. Special Reports: Submit one copy at the time of unusual event.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Owner’s Designee's request.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

B. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

C. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

D. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Quality Assurance: Provide a scheduling specialist (from either the Contractor’s own staff or as a consultant to the Contractor) specializing in CPM with experience in scheduling construction work of a

complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed printout within 72 hours of request.

B. Prepare network analysis diagrams and supporting mathematical analyses based upon information provided by Contractor using MS Project or “Primavera Project Planner” by Primavera System, Inc.

C. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

D. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

E. Activities: Identify work of separate stages, phases, buildings, floor levels and other logically grouped activities and major project milestones based on the schedule of values. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 15 days, unless specifically allowed by Owner’s Designee.
   a. Provide sub-schedules for each stage of Work identified in Division 1 Section "Summary" or elsewhere in the Contract Documents.
   b. Provide sub-schedules to define critical portions of the entire schedule.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery. Refer to related requirements in Division 1 Section "Submittal Procedures".
3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than 10 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Owner’s Designee's administrative procedures necessary for certification of Substantial Completion.
   a. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
6. Final Completion shall be allotted 15 days after substantial completion and shall be included in the total time under the contract.

F. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
2. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within fourteen (14) days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
   1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than fourteen (14) days after date established for the Notice to Proceed.
      a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Owner’s Designee's approval of the schedule.
   2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
   3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
   4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals.
      b. Mobilization and demobilization.
      c. Purchase of materials.
      d. Delivery.
      e. Fabrication.
      f. Utility interruptions.
      g. Installation.
   2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
   3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
   4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
      a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

D. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
   1. Contractor or subcontractor and the Work or activity.
   2. Description of activity.
   3. Principal events of activity.
   4. Immediate preceding and succeeding activities.
   5. Early and late start dates.
   6. Early and late finish dates.
   7. Activity duration in calendar days.
   8. Total float or slack time.
   9. Average size of workforce.

10. Dollar value of activity (coordinated with the Schedule of Values).

E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in calendar days.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

F. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
   a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

   b. Submit value summary printouts three days before each regularly scheduled progress meeting.

2.5 REPORTS

A. Daily Construction Reports:
1. Contractor to prepare a daily construction report recording project activity including but not limited to:
   a. List of subcontractors at Project site.
   b. List of separate contractors at Project site.
   c. Number of workers in each trade on site (and the duration of their stay).
   d. Number of journeymen and certified journeymen on site for each trade.
   e. High and low temperature and general weather conditions (including a summary of changing conditions through the day).
   f. Approximate hours on the project site.
   g. Equipment at Project site.
   h. Material deliveries.
   i. Accidents.
   j. Meetings and significant decisions.
   k. Unusual events (refer to special reports).
   l. Stoppages, delays, shortages, and losses.
   m. Meter readings and similar recordings.
   n. Emergency procedures.
   o. Orders and requests of authorities having jurisdiction.
   p. Visits by the Owner, Project Consultant and Sub-Consultant.
   q. Change Orders received and implemented.
   r. Construction Change Directives received and implemented.
   s. Services connected and disconnected.
   t. Equipment or system tests and startups.
   u. Partial Completions and occupancies.
   v. Substantial Completions authorized.
2. Make Daily Construction Reports immediately available on site to the Project Consultant, Owner and other jurisdictional authorities.

B. Weekly Progress Reports: At the end of each week, Contractor is to summarize and attach the Daily Construction Reports. Include reports from subcontractors.

C. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

2.6 SPECIAL REPORTS

A. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
   1. Submit special reports to the Project Consultant and the Owner within one day of an occurrence. Submit copies of the report to other entities that are affected by the occurrence.
   2. Reporting Accidents: Prepare and submit reports of significant accidents on the project site or anywhere else the Work is in progress.
      a. Record and document data and actions. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

B. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule three days before each regularly scheduled progress meeting.
   1. Revise the schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with an updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate Actual Completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Owner and Owner’s Designee, subcontractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320

SECTION 01322 PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
   1. Pre-construction photographs.
   2. Pre-construction video.
   3. Periodic construction photographs.
   4. Final Completion construction photographs.

B. Related Sections include the following:
   1. Section 01330 for submitting photographic documentation.

1.3 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects.

1.4 COORDINATION

A. Auxiliary Services: Cooperate with Photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

B. Coordinate with FAA regulations for restrictions with drone photography.

1.5 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from Photographer to Owner and Owner's Designee for unlimited reproduction of photographic documentation.

1.6 ADDITIONAL ITEMS

A. Extra Prints: If requested by Owner's Designee, photographer shall prepare extra prints of photographs. Photographer shall distribute these prints directly to designated parties who will pay the costs for extra prints.

B. Digital Images: Provide a flash drive, with each submittal, containing digital images of the photographs. Digital Images shall be in JPEG format with minimum 1200 dpi resolution.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Camera: Digital camera, 15 megapixels, or greater.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
   1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Film Images:
   1. Field Office Prints: Retain one set of progress photographs in the field office at Project site, available at all times for reference. Identify photographs same as for those submitted to Owner's Designee.

C. Pre-construction Photographs and Videos: Take color photographs and videos of Project site and surrounding properties, including existing items to remain during construction and those that will be re-located, from different vantage points, as directed by Owner's Designee within 30 days before start of work.
   1. Flag construction limits before taking construction photographs.
   2. Take at least eight photographs to show existing conditions adjacent to property before starting the Work.
   3. Take at least eight photographs of existing buildings either on or adjoining property to accurately record physical conditions at the start of construction.
   4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
   5. Provide (3) flash drives with pre-construction digital images in JPEG format with minimum 1200 dpi and digital videos in AVI, MWV, MOV or MP4 format with minimum 1080p resolution.

D. Periodic Construction Photographs: Take at least four aerial color photographs monthly**,** with the cutoff date associated with each Application for Payment. Select vantage points to show the status of construction and progress since the last photographs were taken.
   1. Employ professional commercial aerial photographer acceptable to the Project Consultant, to take construction record photographs periodically during the course of work. Photographer shall be a firm or individual of established reputation who has been regularly engaged as a professional aerial photographer for not less than two years. Provide two references for which the aerial photographer has performed work of similar nature during the preceding twelve (12) months.
   2. Provide aerial photograph with each monthly application for payment and as follows:
      a. Existing site prior to the start of Contractor operations.
      b. Demolition.
      c. Structural framing.
      d. Substantial and Final Completion of a major phase or component of work.
   3. Digital Images: Provide (3) flash drives, with each submittal, containing digital images of the aerial photographs. Digital Images shall be in JPEG format with minimum 1200 dpi resolution.
   4. Costs photographer:
      a. Pay costs for specified photography and prints.
      b. Parties requiring additional photography or prints authorized by the Owner will pay photographer directly.
      c. Additional Photo Missions/Views/Prints: From time to time the Owner or Owner's Designee may issue requests for additional photo missions/views/prints, in addition to periodic photo missions/views/prints specified. Additional requirements will be paid to the Photographer directly by the Owner or Owner's Designee.
      d. The Owner's Designee will give the photographer 3 working days' notice where feasible.
      e. In emergency situations, the photographer shall take additional photographs within 24 hours of the Owner's Designee's request.

f. Additional Prints, when requested by the Owner's Designee and approved by the Owner, shall be provided at prevailing local commercial prices to designated parties. The designated parties, in each case, shall pay the photographer directly for such prints.

5. Technique:
   a. Provide factual presentation
   b. Photographs shall be taken during good weather conditions with adequate lighting. Photographs with cloud shadows on the primary target shall not be acceptable.
   c. Maximum depth of field and critical focus is required to produce images with high resolution and contrast to show maximum detail with minimum grain. A lens corresponding to the film format, which will control optical distortion, shall be used.
   d. Aerial Views and Quantities Required:
      aa. Photograph the work from a minimum of three (4) different directions (views) as approved by the Owner's Designee with vantage points to best show the entire site and detailed close-ups, status of construction and progress since taking the previous photographs. Unless requested otherwise, take all monthly photographs from the same direction and altitude.
      bb. The altitude and angle of view selected by the aerial photographer will be such that the image captured will include and emphasize the entire site while eliminating, as much as possible, excessive amounts of foreground, background and especially horizon and sky.
6. Photography Submittals:
   a. Deliver PDF of each view with each Application for Payment with transmittal letter specified under Division 1 Section "Submittal Procedures".
7. Deliver prints not required for an Application for Payment three (3) days after exposure with transmittal letter specified under Division 1 Section "Submittal Procedures

E. Final Completion Construction Photographs: Take at least twelve color photographs after date of Substantial Completion for submission as Project Record Documents. Owner's Designee will direct photographer for desired vantage points.
   1. Do not include date stamp.

F. Submittals:
   1. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.
   2. Deliver prints with each Application for Payment with transmittal letter specified under Division 1 Section "Submittal Procedures".
   3. Deliver prints not required for an Application for Payment three (3) days after exposure with transmittal letter specified under Division 1 Section "Submittal Procedures".

END OF SECTION 01322

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:

1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
4. Division 1 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
5. Division 1 Section "Closeout Procedures" for submitting warranties.
6. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
7. Divisions 2 through 9 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Owner’s Designee's responsive action.

B. Informational Submittals: Written information that does not require Owner’s Designee's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Owner’s Designee for Contractor's use in preparing submittals. The cost for each CAD file will be $200 and paid by the contractor at the receipt of the file.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Owner’s Designee reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner’s Designee's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner’s Designee will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Owner’s Designee's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Owner’s Designee.
3. Include the following information on label for processing and recording action taken:
    a. Project name.
    b. Date.
    c. Name and address of Owner’s Designee.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.
        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

F. Deviations: Highlight, encircle, and otherwise specifically identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Owner’s Designee observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Owner’s Designee.
2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner’s Designee will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Provide locations on form for the following information:
    a. Project name.

b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number - numbered consecutively.
k. Submittal and transmittal distribution record.
l. Remarks.
m. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Owner's Designee on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
3. Submit CONTRACTOR'S SHOP DRAWING SUBMITTAL CERTIFICATION at the end of this section with each submittal. Submittals without the certification will be returned without action.

I. Resubmittals: Make resubmittals in the same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "Reviewed" or "Reviewed as Noted".

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Use only final submittals with mark indicating "Reviewed" or "Reviewed as Noted" taken by Owner's Designee.

L. All shop drawings and samples are to be submitted in the following groups. All data is to be reviewed by General Contractor as indicated in Sections 01330. Submittal groups must be complete - Incomplete submittals will be rejected.

GROUP SUBMITTALS are as follows:

1. HVAC
All HVAC equipment, controls ductwork, accessories, piping diagrams, etc. All submittals in one group.

2. Electric
Lighting Fixture package, controls, switch gear, etc. All submittals in one group.

3. Plumbing
Fixture package, risers, accessories, fire sprinklers, etc. All submittals in one group.

4. Structural
Group 1: Foundation rebar, soil compaction reports, concrete mix, concrete block, column rebar.
Group 2: Roof framing systems (Restroom building, restroom upper canopy, pavilion shelter), miscellaneous metals, miscellaneous steel column, exterior framing, etc.

5. Architectural
Group 1: All Interior finishes, equipment, accessories, etc.
Group 2: Exterior finishes, curtainwall, doors, hardware, windows, roofing, stucco reglet, trims, reveals, pavers, etc.

6. Site Elements
   Group 1: Synthetic track surfacing
   Group 2: Field Sports equipment
   Group 3: Bleachers
   Group 4: Shade structures
   Group 5: Signage, fencing, benches, trashcans, bike racks, etc.

7. Civil
   Group 1: Water and Sewer
   Group 2: Paving and Drainage
   Group 3: Pollution Prevention
   Group 4: Signage

8. Landscape
   Group 1: Landscape material
   Group 2: Irrigation material

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
   1. Number of Copies: Submit pdf copies of each submittal. Mark up and retain the returned copy as a Project Record Drawing. The owner requires one pdf copy only.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's written recommendations.
      b. Manufacturer's product specifications.
      c. Manufacturer's installation instructions.
      d. Standard color charts.
      e. Manufacturer's catalog cuts.
      f. Wiring diagrams showing factory-installed wiring.
      g. Printed performance curves.
      h. Operational range diagrams.
      i. Standard product operation and maintenance manuals.
      j. Compliance with specified referenced standards.
      k. Testing by recognized testing agency.
      l. Notation of coordination requirements.
   4. Submit Product Data concurrent with Shop Drawings and Samples.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Dimensions.
      b. Identification of products.
      c. Fabrication and installation drawings.
      d. Roughing-in and setting diagrams.
      e. Schedules.
      f. Design calculations.

g. Compliance with specified standards.
h. Notation of coordination requirements.
i. Notation of dimensions established by field measurement.
j. Relationship to adjoining construction clearly indicated.
k. Seal and signature of professional engineer if specified.
l. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of appropriate Specification Section.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
a. Number of Samples: Submit Three (3) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Owner’s Designee will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
a. Number of Samples: Submit Six (6) sets of Samples. Owner’s Designee will retain three Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit pdf copies of product schedule or list.
a. Mark up and retain one returned copy as a Project Record Document.

F. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. **Use** CSI Form 1.5A. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.
   4. Number of Copies: Submit pdf copies of subcontractor list.
      a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
   1. Number of Copies: Submit pdf copies of each submittal. Mark up and retain the returned copy as a Project Record Drawing. The owner requires one pdf copy only.
   2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 1 Section "Project Management and Coordination."

C. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

M. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."

N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."

P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.

6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

T. Construction Photographs: Comply with requirements specified in Division 1 Section "Photographic Documentation."

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Owner's Designee.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit six copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include a list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner's Designee.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 OWNER'S DESIGNEE'S ACTION

A. General: Owner's Designee will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Owner's Designee will review each submittal, make marks to indicate corrections or modifications required, and return it. Owner's Designee will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Final Unrestricted Release: Where the submittals are marked as follows, the work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents; acceptance of the work will depend upon that compliance.

Marking: "No Exceptions taken"

2. Final-But-Restricted Release: When the submittals are marked as follows, the work covered by the submittal may proceed provided it complies with both the Owner's Designee's/Engineer's notations or corrections on the submittal and with the requirements of the contract documents; acceptance of the work will depend on that compliance.

   Marking: "Make corrections noted".

3. Returned for Re-Submittal: When the submittal is marked as follows do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise the submittal or prepare a new submittal in accordance with the Owner's Designee's/Engineer's notations stating the reasons for returning the submittal; re-submit the submittal without delay. Repeat if necessary to obtain a different action marking. Do not permit submittals with the following marking to be used at the project site, or elsewhere where work is in progress.

   Marking: "Rejected"
   Marking: "Revise and Resubmit"
   Marking: "Submit Specified Item"

C. Informational Submittals: Owner's Designee will review each submittal and will not return it, or will return it if it does not comply with requirements. Owner's Designee will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Submit CONTRACTOR'S SHOP DRAWING SUBMITTAL CERTIFICATION at the end of this section with each submittal. Failure to submit required certification will result in rejection of the submittal. Additional time or compensation will not be given to the Contractor for delays caused by the contractor not following the stated submittal requirements.

G. The first submittal for each required item will be reviewed free of charge. Each subsequent submittal review, for previously failed or incomplete submittals, will be billed on an hourly basis at $180 / hr. Contractor shall be responsible for payment of rejected submittals on a monthly basis. Non-payment will result in termination of review services.

END OF SECTION 01330

CONTRACTOR'S SHOP DRAWING SUBMITTAL CERTIFICATION

Project Name:
Owner:
Contractor:

Date:

Submittal Title: Specification Section:
Submittal Group:

I, _____, as the General Contractor's authorized representative of the said project, certify that the attached shop drawing submittal complies specification section 01330, all other applicable specification sections, and the construction documents. I have reviewed the shop drawings submitted by the suppliers or sub-contractors and the following conditions have been satisfied:

Yes	*No*	*N/A*	
☐	☐	☐	Have minimum required quantity of submittals attached. Number of submittals _____
☐	☐	☐	Have you reviewed the shop drawing submittal for conformance with the plans and specifications. All dimensions been cross-checked with plans and field verified for actual dimensions.
☐	☐	☐	Have you marked all applicable options and accessories to be supplied or required.
☐	☐	☐	Have you coordinated with all other trades or associated items (i.e. elec. voltage, data, water supply, venting, etc.)
☐	☐	☐	Is the submitted product identical to the specified item in section _____
☐	☐	☐	All deviations from the plans or specification have been clearly identified on each page.
☐	☐	☐	For all exterior components, are the Metro-Dade product approvals attached
☐	☐	☐	Have you reviewed the Metro-Dade product approval.
☐	☐	☐	For sample specified, are material samples with specified finish and color attached
☐	☐	☐	If sign and sealed engineering is specified, are the engineering calculations attached.
☐	☐	☐	If manufacturer's product data is specified, is the information attached
☐	☐	☐	Have you reviewed and noted manufacturer's instructions and recommendations
☐	☐	☐	If a warranty is specified, is a sample warranty for the specified period attached.
☐	☐	☐	If installer's qualification certification specified, is the certification attached.
☐	☐	☐	If Producer's Statement of applicability required, is one attached.

If you answered 'NO' to any question listed above, do not forward the submittal to the Owner's Designee. It will not be reviewed. All reviews after the first review, will be billed directly to the general contractor.

Signature _____ Title_____ Date_____

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:
   1. Division 1 Section "Project Record Documents" for final testing reports, inspection records, and certifications.
   2. Divisions 2 through 9 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

F. Product Testing: Tests and inspections that are performed by a nationally recognized testing laboratory, a national voluntary laboratory accreditation program, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Quantities or Amounts: If conflict arises on the quantity or amount of a particular item or material, Contractor shall include in his/her bid the one of greater quantity or amount between the two. Contractor shall inform Architect’s office of conflict prior to ordering any materials.

C. Systems or Conditions: If conflict arises between two systems or conditions, Contractor shall include in his/her bid the one of highest cost. Contractor shall inform Architect’s office of conflict prior to ordering any materials.

D. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
   1. Specification Section number and title.
   2. Description of test and inspection.
   3. Identification of applicable standards.
   4. Identification of test and inspection methods.
   5. Number of tests and inspections required.
   6. Time schedule or time span for tests and inspections.
   7. Entity responsible for performing tests and inspections.
   8. Requirements for obtaining samples.
   9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.7 QUALITY CONTROL

A. Tests and inspections are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
6. The following tests, inspections, and certifications shall be performed by independent testing agencies, special inspectors, or professional engineers hired by the contractor to provide quality control services:
    a. Soils compaction and density.
    b. Concrete cylinder tests.
    c. Structural welding certification.
    d. Structural Engineered Masonry Inspections
    e. Structural Steel Erection and Connections
    f. As-built site lighting photometric plan.
    g. ADA compliance certification.

B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   4. Facilities for storage and field curing of test samples.
   5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   6. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
   1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Contractor will engage a qualified testing agency, special inspector, or professional engineer to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
   1. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   2. Submitting six copies of a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
   3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retesting and reinspecting corrected work.
6. The following inspections and certifications shall be performed by independent testing agencies, special inspectors, or professional engineers hired by the contractor to provide quality control services:
    a. Engineered Masonry
    b. Welding
    c. Truss / Joist Erection
    d. Fastening and Connections

B. Contractor shall be responsible for paying for inspections and delegated professional engineering required during construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01410 – REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control, but not limited to, the following:
   1. Description of Requirements
   2. Codes and Standards
   3. Governing Regulations and Authorities
   4. Submittal

B. Related Sections include the following:
   1. Division 1 Section "Quality Requirements"

1.3 DESCRIPTION OF REQUIREMENTS

A. General:
   1. This section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. These requirements include obtaining permits, licenses, inspections, releases and similar requirements associated with the regulations, codes and standards.
   2. The term “Regulations” is defined to include laws, statutes, ordinances, and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively controls the performance of the Work regardless of whether they are lawfully imposed by governing authority or not.
   3. Governing Authority: For requirements related to compliance with governing regulations, refer to:
      1) City of Pompano Beach
      2) Broward County
      3) South Florida Water Management District
      4) State of Florida
   4. General Requirements: Provisions and requirements of the Contract and other Division 1 specification sections apply to the entire Work defined by the Construction Documents. As such, there is no need to separately enumerate the application of those documents within the individual specification sections or the drawings.

1.4 DEFINITIONS

A. Certain terms used in the Construction Documents are defined in this Section. Definitions and explanations contained in this Section are not necessarily complete, but are general for the Work to the extent that they are not stated more explicitly in another document within the Construction Documents.

1. Indicated: refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in Specifications, and similar requirements in Construction Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.
2. Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the Architect", "requested by the Architect", and similar phrases. However, no implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
3. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor 's submittals, applications, and requests, is limited to the duties and responsibilities of the Architect as stated in the Contract, General Requirements of the Contract or other Division 1 Specifications. Such approval shall not release the Contractor from responsibility to fulfill Contract requirements unless otherwise provided in the Construction Documents.
4. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
5. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
6. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."
7. Project Site: is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other construction activities as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.
8. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.5 CODES AND STANDARDS

A. Except where earlier editions are specifically indicated, latest editions with current revisions and amendments of the following codes and standards are considered minimum requirements for materials, workmanship and safety where not covered elsewhere in these specifications.

B. Codes and Standards:
1. Obtain copies of the following regulations (unless otherwise indicated) and retain at the project site, available for reference by parties who have a reasonable need for such reference:
    a. Florida Building Code – 2020, Seventh Edition with latest revisions.
    b. Florida Fire Prevention Code – Seventh Edition with latest revisions.
    c. National Electric Code – 2020 edition.
    d. ASCE 7-16
    e. OSHA safety standards.

1.6 GOVERNING REGULATIONS/AUTHORITIES FEES

A. Coordinate inspections and regulatory requirements of the agencies specified above under provisions of Division 1 Section "Quality Requirements".

B. Contractor shall obtain all permits.
1. Review / Permit fees for all agencies and all re-inspection fees will be paid by the Contractor.
2. All impact fees to the County or other agencies will be paid by the Contractor.

1.7 SUBMITTALS

A. Licenses and Certificates: Submit copies of licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon the performance of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01410

SECTION 01420 REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Related Sections include the following:

1. Division 1 Section "Quality Requirements"
2. Division 1 Section "Regulatory Requirements"
3. Division 1 Section "Quality Assurance"

1.3 DRAWING SYMBOLS

A. Except as otherwise indicated, graphic symbols used on the Drawings are those symbols recognized in the construction industry for the purposes indicated. Where not otherwise noted, symbols are defined by “Architectural Graphic Standards”, published by John Wiley & Sons, Inc., eleventh edition or later.

B. Mechanical and Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE and/or The National Electric Code (NEC). Where appropriate these symbols are supplemented by more specific symbols as recommended by other technical associations including ASME, ASPE, IEEE and other similar organizations.

C. Refer instances of uncertainty to the Project Consultant for clarification prior to proceeding.

1.4 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's format and MASTERFORMAT numbering system.

B. Specification Conventions: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
3. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.
4. Abbreviations: Actual word abbreviations of a self-explanatory nature may be included within the Technical Specification. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specifications with notations on drawings and schedules. These abbreviations are frequently defined in the specification section at the first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural

word will be interpreted as singular where applicable and where full context of the Contract Documents so indicates. Refer instances of uncertainty to the Project Consultant for decision prior to proceeding.

C. Specification Content:
   1. The techniques or methods of specifying to record requirements vary throughout the Technical Specification. These methods may include: “prescriptive”, “open generic-descriptive”, “compliance with standards”, “performance”, “proprietary” or a combination of these. The method used for specifying one element of the Work has no bearing on requirements for another element of the Work.
   2. Overlapping and Conflicting Requirements: Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards establishes different or conflicting minimums or levels of quality, the most stringent (which is generally recognized to also be the most costly) is intended and will be enforced unless specifically detailed language written into the Contract Documents (not by way of reference to an industry standard) clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements and other uncertainties to the Project Consultant for a decision prior to proceeding.
   3. Contractor’s Options: Except for overlapping or conflicting requirements where more than one set of requirements are specified for a particular unit of Work, option is intended to be Contractor’s regardless of whether or not it is specifically intended as such.

D. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as minimum for the Work to be performed or provided. Except as otherwise specifically indicated, actual Work may either comply exactly with that minimum (within reasonable specified tolerances) or may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are either minimums or maximums as not or as appropriate for the context of the requirements. Refer instances of uncertainty to the Project Consultant for decision prior to proceeding.

E. Assignment of Specialists: The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
   1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
   2. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that the requirements specified apply exclusively to tradespersons of the corresponding generic name.

1.5 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual Sections indicate which codes and standards the Contractor must keep available at the Project Site for reference.

B. Publication Dates: Where the date of issue of a referenced standard is not specified, comply with the standard in effect as of date of bidding.
   1. Updated Standards: At the request of the Project Consultant, Contractor, or authority having jurisdiction, submit a Change Order proposal where an applicable code or standard has been revised and reissued after the date of the Contract Documents and before performance of Work

affected. The Project Consultant and Owner will decide whether to issue a Change Order to proceed with the updated standard.

C. Copies of Standards:
   1. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
   2. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
   3. Although copies of standards needed for enforcement of requirements also may be included as part of required submittals, the Project Consultant reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

D. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co. or other similar guides available from The Construction Specifications Institute, American Institute of Architects, etc.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01430 – QUALITY ASSURANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division l Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance, but not limited to, the following:
   1. Fabricator's Qualifications
   2. Installer's Qualifications
   3. Manufacturer's Qualifications
   4. Manufacturer's Field Services
   5. Supplier Qualifications
   6. Professional Engineer Qualifications
   7. Testing and Inspection Agency Qualifications

1.3 FABRICATOR'S QUALIFICATIONS

A. A "Fabricator" is the Contractor, or an entity engaged by the Contractor, either as en employee, subcontractor or sub-subcontractor to construct assemblies required for the Work from diverse, usually standardized manufactured parts or components either on the project site or in a shop setting.

B. The term "experienced," when used with the term "fabricator" means:
   1. Having a minimum of five (5) previous consecutive years of experience in the regular fabrication of assemblies, sub-assemblies, or components similar to those specified, and
   2. Being familiar with the requirements of Florida High Velocity Hurricane Zone.

C. Fabricators, and the Contractor's workforce in general, are required to comply with the workforce composition requirements specified in General Requirements and further specified below.

1.4 INSTALLER'S QUALIFICATIONS

A. An "Installer" is the Contractor, or an entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged in performing.

B. The term "experienced," when used with the term "Installer" means:

   1. Having a minimum of (5) previous Projects similar in size and scope to this Project,
   2. Being familiar with the precautions required.
   3. Having complied with the workforce composition and other requirements of the City of Pompano Beach, Florida and other jurisdictional authorities involved in the Work.

C. Provide the levels of more extensive experience that may be specified within the respective specification sections contained in this Project Manual.

D. Installers, and the Contractor's workforce in general, are required to comply with the workforce composition requirements specified in General Requirements and further specified below.

1.5 MANUFACTURER'S QUALIFICATIONS

A. A "Manufacturer" is a person or entity who produces materials or equipment for the Work, including that manufactured to a special design, but who does not perform labor at the site. Manufacturers are required to be experienced in the operations they are engaged in performing.

B. The term "experienced," when used with the term "Manufacturer" means:
   1. Having a minimum of (5) previous consecutive years of experience in the regular manufacture of products, materials, components, and assemblies similar to those specified.

C. Upon request, provide:
   1. Location of the Manufacturer including foreign or domestic status.
   2. Evidence of the time period in which the manufacturer has been producing the specified products, materials, components or assemblies without formulation, engineering, design or other production changes which would alter or modify their performance characteristics.
   3. Listings of the manufacturer's authorized franchised distributors, installers, or applicators.
   4. Manufacturer's latest product performance criteria and test results.
   5. List of the manufacturer's technical services and their local availability.
   6. Other pertinent information to establish the capacity, capability and quality of the manufacturer as may be requested by the Project Consultant or Owner.

D. The Owner reserves the right to require replacement of any manufacturer to whom reasonable objection is made by the Owner or Project Consultant.

1.6 MANUFACTURER'S FIELD SERVICES

A. Submit qualifications of manufacturer's, suppliers, distributors or other entity's observers to Project Consultant and Owner (30) days in advance of required observations. Observer subject to approval of Project Consultant and Owner and the Owner reserves the right to replace any observer for whom reasonable objection is made.

B. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, or other conditions as applicable, and to initiate instructions when necessary.

C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report in duplicate within (15) days of observation to Owner for review.

1.7 SUPPLIER QUALIFICATIONS

A. A "Supplier" is a person or entity who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site. Suppliers are required to be experienced in the operations they are engaged in performing.

B. The term "experienced," when used with the term "Supplier" means:
   1. Having supplied products or materials for a minimum of (5) previous projects similar in size and scope to the Work specified herein.
   2. Having been in the regular business of supplying similar products and materials for the preceding consecutive (3) years.

C. The Owner reserves the right to require replacement of any Supplier to whom reasonable objection is made by the Owner or the Project Consultant.

1.8 PROFESSIONAL ENGINEER QUALIFICATIONS

A. A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

1.9 TESTING AND INSPECTION AGENCY QUALIFICATIONS

A. An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

B. Testing and Inspection Agencies may be hired, paid for, and utilized by the Contractor for the Contractor’s use at no additional expense to the Owner except as otherwise provided in the Contract Documents.

C. Such testing and inspection agencies: meet the following qualifications:
   1. Laboratory: Authorized to operate in State in which Project is located.
   2. Laboratory Staff: Maintain a full-time registered Engineer and the necessary specialists on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.10 LICENSURE REQUIREMENTS

A. City of Pompano Beach requires the utilization of a workforce, which holds State of Florida Certification, or a certificate of competency obtained through a proctored examination for the following crafts or trades. Ensure compliance with the licensure requirements if the listed crafts or trades (as mandated by Chapter 489 of the Florida Statute) are required for the execution of the Work:

   1. Plumbing and Specialty Plumbing Contractors:
      a. Master Plumber
      b. Specialty Plumbing Contractors:
         1) Lawn Sprinkler Plumber
         2) Master Natural Gas Fitter
         3) Solar Heat Installer
      c. Journeyman Plumber
      d. Journeyman Natural Gas Fitter: Specialty Journeyman Plumber

2. Electrical and Specialty Electrical Contractors:
    a. Master Electrician
    b. Specialty Electricians:
        1) Burglar Alarm Electrician
        2) Central Community TV and Radio Specialty Contractor
        3) Electrical Sign Master Electrician
        4) Fire Alarm Electrician
        5) Lightning Protection Systems Contractor
        6) Low Voltage Electrician
        7) Communications
    c. Journeyman Electrician
    d. Electrical Sign Journeyman
    e. Maintenance Electrician Journeyman

3. Mechanical and Specialty Mechanical Contractors:
    a. Sheet Metal Contractor
    b. Class A Air Conditioning Contractor
    c. Mechanical Contractor
    d. Transport Assembly Contractor
    e. Insulation Contractor
    f. Central Vacuum System Contractor
    g. Pneumatic Control Contractor
    h. Specialty Mechanical Technicians
    i. Specialty Air Conditioning Technicians Class "C"
    j. Specialty Air Conditioning Technicians Class "D":
        1) Class "A" Refrigeration Technician
        2) Class "B" Refrigeration Technician
        3) Warm Air Heating Technician
        4) Insulation Contractor
        5) Mechanical Maintenance Technician
    k. Mechanical Journeyman:
        1) Insulation Journeyman
        2) Journeyman Mechanical Technician
        3) Sheet Metal Journeyman

4. Engineered Construction Contractors:
    a. General Engineered Construction Builder
    b. Special Engineered Construction Categories
    c. Specialty Engineered Utility and Drainage Builders:
        1) Primary Pipelines (Water, Sewer, Drainage) - Class "A"
        2) Secondary Pipelines (Water, Sewer, Drainage incidental to parking lots) - Class "B"
        3) Plant Construction (Water Treatment, sewage treatment, industrial complexes, pump and lift stations, incinerators) - Class "C"
        4) Fuel Transmission and Distribution Lines - Class "D"
        5) Underground and Aerial Utility Transmission and Distribution Lines - Class E"
        6) Feeder Distribution Interface (FDI Telephone Boxes) Installer - Class "F"
        7) Cable Television - Class "G"
        8) Jack and Bore Installer - Class "H"
        9) Limited to Irrigation Systems in the Public Right of Way
    d. Specialty Engineered Structural Builders:
        1) Heavy Marine (Harbor facilities, Docks, Shipyards, Bulkheads, Retaining Walls, Seawalls, Dams, Locks) - Class "A"
        2) Bridges, Overpasses, Underpasses - Class "B"
        3) Tunnels - Class "C"

4) Light Marine (Seawalls, Retaining Walls, Davits, Boat Lifts, Small Docks) - Class "D"
5) Pile Driving - Class "E"

e. Specialty Engineered Paving Builders:
1) Major Roads (Asphalt and Concrete Paving for Interstate, Primary, Secondary and Arterial Roadways and Airports and Work Incidental Thereto) - Class "A"
2) Minor Roads - (Asphalt and Concrete Paving for Subdivision Facilities and Work Incidental Thereto) - Class "B"
3) Concrete Driveways, Curbs, Gutters, and Sidewalks - Class "C"
4) Sealcoating - Class "D"
5) Surfacing (Tennis Courts, bikepaths, driveways, parking lots, with drainage incidental thereto being limited to soakage pits and drywells) - Class "E"
6) Striping, Marking, and Signage of Major and Minor Roadways to include pavements - Class "F"

f. Specialty Engineered Earthwork Builders:
1) Excavating (canals, lakes, levees) - Class "A"
2) Clearing and Grading - Class "B"
3) Dredging (Canals, lakes and waterways) - Class "C"

5. General and Specialty Building Contractors:
a. General Building - Class "A" - Unlimited
b. General Building - Class "B" - Commercial
c. General Building - Class "C" - Residential
d. Limited Specialty Building Categories:
1) Acoustical Ceilings Category - Class "A"
2) Awning Erection Category - Class "AE"
3) Cabinet Installation Category - Class "C"
4) Concrete Placing and Finishing Category - Class "CP"
5) Demolition Category (Nonexplosive) - Class "A"
6) Down Spouts and Gutters: Under Miscellaneous metals or roofing.
7) Drywall and Lathing Category - Class "DL"
8) Elevator Installation and Maintenance Category - Class "E"
9) Fence Erection Category - Class "F"
10) Finish Carpentry Category - Class "FC"
11) Flooring Category - Class "FL"
12) Glazing Category - Class "G"
13) Gunite Category - Class "GU"
14) Insulation Category - Class "I"
15) Masonry Category - Class "M"
16) Miscellaneous Metals Erection Category - Class "MM"
17) Painting (Interior and Exterior) Category - Class "P"
18) Painting Unlimited Category - Class "PU"
19) Plastering and Stucco Category - Class "PS"
20) Roof Decks Category - Class "RD"
21) Roof Painting and Cleaning Category - Class "RP"
22) Roofing Category - Class "R"
23) Rough Carpentry and Framework Category - Class "RC"
24) Screen Enclosures Category - Class "SC"
25) Sign Erection Category - Class "SE"
26) Steel Reinforcing and Iron Category - Class "SR"
27) Structural Steel Category - Class "SS"
28) Tile and Marble Category - Class "TM"
29) Waterproofing Category - Class "W"

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01430

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.4 EXISTING CONDITIONS

A. The site is in use 24 hours / day, 7 days / week. Contractor is required to perform the needed work for their construction effort in a way that does not disturb the function or interrupt ongoing operations. All work must be coordinated and scheduled with approval from the owner's staff. Contractor shall provide temporary chain link fencing at the perimeter of the construction area. Also provide barricades, signage, and all other means necessary to protect the public from harm. Contractor shall provide protected temporary access paths to all existing facilities adjacent to the construction area. Contractor shall frequently remove all construction debris from the protected temporary access paths and areas outside the work limits, but not less than once a day. Contractor shall remove temporary paths and restore those areas after the construction work is complete.

B. Contractor shall construct the project in phases as indicated on the construction drawings. Contractor may coordinate with the Owner and submit an alternate plan to the Owner for approval.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 8-feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails. Provide screen mesh vision barrier. Provide minimum (2) 12' wide x 8' high gates for construction access.

B. Traffic Barricades: High-visibility Water-filled Plastic Jersey barriers for use in construction areas, temporary work zones to ensure safety and minimize damage to vehicles. Provide flashing lights for night-time visibility.

C. Field Offices, General: Contractor may use a portion of the site being renovated as a field office.

D. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
   1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
   2. Drinking water and private toilet.
   3. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
   4. Lighting fixtures capable of maintaining average illumination of 50 fc at desk height.
   5. Codes: Contractor shall have a copy of the reference codes and standards, including but not limited to Florida Building Code, latest edition, on site at all times during construction.
   6. Fire Extinguisher: Contractor shall provide and maintain in working order, at least one twenty (20) pound capacity dry chemical type fire extinguisher, suitable for Class A, B or C fires.

D. Contractor Use Storage Container: Provide storage container sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Contractor to include rental cost for contractor's storage container in the base bid.
   2. Store combustible materials apart from building.

E. Environmental Protection: Provide Best Management Practices environmental protection equipment to prevent air, soil, and water pollution in and around the project site. BMP's shall comply with contract specifications, FDEP regulations and FDOT standards. Contractor shall be solely liable and responsible for any fines issued by the regulatory agencies due to non-compliance or inadequate compliance. BMP's shall be maintained for the construction duration.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove it until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

B. Electric Power Service: Contractor may utilize existing building power on site.

C. Lighting: Provide temporary lighting, if required, with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

D. Telephone Service: Construction Personnel must have access to a cellular telephone.

E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

F. Water Service: Provide hydrant meter connected to existing fire hydrant. Pay for install and water usage fees to the City.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. If used, provide incombustible construction for sheds located within demolition area or within 30 feet of building lines. Comply with NFPA 241.
   2. Maintain support facilities until near Project Completion. Remove before Project Completion.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing adjacent areas to remain.
   2. Maintain access for fire-fighting equipment.
   3. Contractor shall arrange for the delivery of materials and equipment to the site and for the removal of surplus and debris.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Comply with work restrictions specified in Division 1 Section "Summary."
   2. Comply with section 02200, City, County, and State FDEP and FDOT regulations.

B. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

C. Tree and Plant Protection: Comply with requirements specified in Division 2 Section "Tree Protection and Trimming."

D. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: Enclose Construction Materials and work areas – install warning signs and barricades.

E. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Prior to the owner taking full possession, contractor will be fully responsible for replacing any items damaged, destroyed, or removed by vandalism, theft, etc.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting. Protection for work in or adjacent to any right-of-way shall comply with FDOT standards.

G. Temporary Protection: The Contractor shall provide safe access to and from entranceways and/or exits from existing buildings. This may include overhead protection in some areas, with planking or other means when within fenced-in work areas. Also, temporary protection shall be provided at openings through floors or roofs and at edges of slabs in construction areas.

H. The Contractor shall provide necessary weather protection against rain, wind, storms, or heat so as to maintain work, materials and existing building areas free from damage. Cover new work likely to be damaged at the end of each day's work.

I. All contractors shall be responsible for the protection of adjoining areas and materials, including glass, when welding, flame cutting or performing any other operation requiring the use of flame, arcs or sparking devices in the course of the work. Use only flame-proof type tarpaulins.

J. Contractor shall provide and maintain in working order, at least one twenty (20) pound capacity dry chemical type fire extinguisher, suitable for Class A, B or C fires for every 2500sf of new construction / renovation area, or 75 foot on center distance, whichever is greater.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 01500

SECTION 01561 - CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division l Specification Sections, apply to this Section.

1.2 REQUIREMENTS INCLUDED

A. Contractor shall enforce daily cleaning during progress of Work and enforce final cleanup prior to Substantial Completion.
   1. Hazards Control:
      a. Store volatile wastes in covered metal containers outside the building.
      b. Remove containers from premises daily.
      c. Prevent accumulation of wastes that create hazardous conditions.
      d. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:
   1. Do not burn or bury rubbish or waste materials on Project Site.
   2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
   3. Transport waste materials and debris across airport property in covered trucks.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use cleaning materials recommended by manufacturer or surface to be cleaned which will not create hazards to health or property and which will not damage surfaces.

B. Use green cleaning products and procedures to comply with LEED IEQ requirements.

PART 3 - EXECUTION

3.1 CLEANING DURING CONSTRUCTION

A. Enforce cleaning to keep building, grounds, and public properties free of accumulation of waste materials, rubbish, and windblown debris resulting from construction operations.

B. Have protective covering applied on newly installed Work where reasonable required to ensure freedom from damage or deterioration at time of Substantial Completion. Enforce cleaning and maintenance on other newly installed Work as frequently as necessary through remainder of construction period.

C. Have operable components adjusted and lubricated to ensure operability without damaging effects.

D. Furnish on-site containers for collection of waste materials, debris, and rubbish.

E. Remove waste material, debris, and rubbish from Site daily.

F. Do not drop or throw materials from heights.

G. Continue enforcing cleaning daily until site is ready for occupancy.

3.2 DUST CONTROL

A. Wet down materials and rubbish to prevent blowing dust on a regular basis.

B. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.3 FINAL CLEANING

A. Provide final cleaning of the Work at the time indicated, consisting of cleaning each surface or unit of Work to "clean" condition expected for a first-class building and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:
   1. Remove labels which are not required as permanent labels.
   2. Clean exposed exterior hard-surfaced finishes, to dirt-free condition, free of dust, stains, films, and similar noticeable distracting substances.
   3. Restore reflective surface to original reflective condition.
   4. Remove debris and surface dust from limited access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.
   5. Broom clean concrete floors in non-occupied spaces.
   6. Clean light fixtures and lamps to function with full efficiency.
   7. Clean Project Site, including landscape development areas, of litter and foreign substances.
   8. Sweep paved areas to broom-clean condition: remove stains, petro-chemical spills, and other foreign deposits.
   9. Rake grounds that are neither planted nor paved, to smooth, even-textured surface.

B. Remove waste materials from Site daily and dispose of them in a lawful manner.

C. Removal of protection:
   1. Remove temporary protection devices and facilities that were installed during course of the Work to protect previous completed Work during remainder of construction period.

END OF SECTION 01561

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:
   1. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
   2. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the bidding.
   2. New Products: Items that have not previously been incorporated into another project or facility**,** except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
   1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
   2. Form: Tabulate information for each product under the following column headings:
      a. Specification Section number and title.
      b. Generic name used in the Contract Documents.
      c. Proprietary name, model number, and similar designations.
      d. Manufacturer's name and address.
      e. Supplier's name and address.
      f. Installer's name and address.
      g. Projected delivery date or time span of delivery period.
      h. Identification of items that require early submittal approval for scheduled delivery date.
   3. Initial Submittal: Within 15 days after Notice to Proceed, submit in pdf format, initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
      a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
   4. Completed List: Within 30 days after Notice to Proceed, submit in pdf format, completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
   5. Owner's Action: Owner will respond in writing to Contractor within 15 days of receipt of completed product list. Owner's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Owner's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit six copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use CSI Form 13.1A.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified material or product cannot be provided.
      b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
      i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
      j. Cost information, including a proposal of change, if any, in the Contract Sum.
      k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
      l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Owner's Action: If necessary, Owner will request additional information or documentation for evaluation within **7** days of receipt of a request for substitution. Owner will notify Contractor of acceptance or rejection of proposed substitution within **15** days of receipt of request, or **7** days of receipt of additional information or documentation, whichever is later.
    a. Form of Acceptance: Change Order.
    b. Use product specified if Owner cannot make a decision on use of a proposed substitution within time allocated.

C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Owner's Action: If necessary, Owner will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Owner will notify Contractor of approval or rejection of proposed comparable product request within **15** days of receipt of request, or **7** days of receipt of additional information or documentation, whichever is later.
    a. Use product specified if Owner cannot make a decision on use of a comparable product request within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Refer to Divisions 2 through 9 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Owner will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.

2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: **Requests for substitution will only be accepted during the bid period.**

B. Conditions: Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

SECTION 01700 - EXECUTION AND HURRICANE PROTECTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.
8. Hurricane, Flood, and Other Perils Protection.

B. Related Sections include the following:

1. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Not Used

1.4 QUALITY ASSURANCE

A. Not Used

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

    a. Description of the Work.
    b. List of detrimental conditions, including substrates.
    c. List of unacceptable installation tolerances.
    d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Owner. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owner promptly.

B. General:
    1. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
    2. Inform installers of lines and levels to which they must comply.
    3. Check the location, level and plumb, of every major element as the Work progresses.
    4. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
    5. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
    1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Owner.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended.

If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

3.9 HURRICANE, FLOOD, AND OTHER PERILS PROTECTION

A. In the event the National Weather Service issues a Hurricane or Flood watch:
   1. Contractor shall cease all regularly scheduled construction activities.
   2. Contractor shall take immediate action to secure the building and the site.
   3. Secure all loose materials, supplies, debris, equipment, etc.
   4. All openings in the building exterior shall be boarded up with minimum 3/4" plywood, 2 x 4 lumber, and tap-cons.
   5. Any construction material or equipment that has been delivered to the site with the intent of being used for the project shall be secured within the building or within a sealed metal shipping container placed above the 100-year flood elevation.
   6. Tie down construction trailer, storage shed, etc. with tie down cables secured to ground anchors.
   7. Contractor shall make arrangements to secure pumps, dehumidifying equipment, generator, and gasoline / diesel prior to the storm in the event those items are needed for clean-up.
   8. Contractor shall prepare a project damage assessment report no later than 72 hours after the storm conditions have ceased. A copy of the report shall be sent to the owner, the architect and the insurance company providing builder's risk / wind storm coverage.
   9. Contractor shall prepare an updated project schedule no later than 7 days after the storm conditions have ceased. Highlight any delays to the project specifically caused by the storm event. Consideration shall be made for availability or shortage of labor, material supplies, equipment, and any delays in shipments.

END OF SECTION 01700

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Maintenance Materials
3. Warranties.
4. Final cleaning.

B. Related Sections include the following:
1. Division 1 Section "Execution and Hurricane Protection Requirements" for progress cleaning of Project site.
2. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Divisions 1 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
    a. Contractor shall be responsible for meeting all construction and paper work requirements to obtain such approval within the timeframe stipulated in the contract. Failure on the part of the contractor to secure timely approval will result in assessment of liquidation damages owed to the owner for any resulting delays.
5. Prepare and submit (1) copy in a ring binder and 1 electronic copy of the Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.

9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in electric, water, and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
15. Complete Owner’s provided project closeout spreadsheet. See appendix.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment.
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. If more than one final completion inspection is required, the Contractor will be responsible for paying the Architect for all additional inspections and punch list preparation required by the architect to verify compliance. Final payment application will not be processed until all items have been completed, closeout documentation completed, and re-inspection fees paid.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.

1.6 MAINTENANCE MATERIALS

A. Submit maintenance materials, equipment and accessories of the types and in the quantities specified within the respective specification Sections of Divisions 2 through 5.

B. Provide maintenance materials, equipment and accessories in original manufacturer's packaging with manufacturer's original, clearly legible labeling.

C. Coordinate delivery date and final storage location of maintenance materials, equipment and accessories to the Owner through the Project Consultant prior to requesting Substantial Completion Inspection.

D. Do not utilize maintenance materials or equipment for cleaning, maintenance or other Contractor operations.

E. Test and inspect maintenance materials, equipment and accessories to ensure operability, fitness for purpose and new condition prior to submitting to the Owner.

1.7 WARRANTIES

A. Submittal Time: Submit written warranties on request of Owner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within **15** days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    g. Sweep concrete floors broom clean in unoccupied spaces.
    h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    j. Remove labels that are not permanent.
    k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
        1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    m. Replace parts subject to unusual operating conditions.
    n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    p. Clean ducts, blowers, and coils if units were operated without filters during construction.
    q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

r. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 01780 – CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and special provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for closeout submittals, including the following:
   1. Operation and Maintenance Data
   2. Maintenance Materials
   3. Product Warranties
   4. Product Bonds
   5. Project Record Documents
   6. Spare Parts
   7. Electronic Media
   8. Miscellaneous Schedules
   9. Owner’s Spreadsheet

B. Related Sections include the following:
   1. Division 1 Section "Closeout Procedures"
   2. Division 1 Section "Project Record Documents"

1.3 SUBMITTALS

A. Project closeout submittals required by the Construction Documents for the Work, or a portion thereof, shall be submitted by the Contractor at or prior to the time of his request for the Owner's inspection unless otherwise specified in this Section or elsewhere in the Construction Documents.

B. Architect (assisted by the Owner’s Staff, Test and Balance Consultant and others as applicable) will review project closeout submittals with the Owner for content, accuracy, and format:
   1. If the Owner disapproves or rejects any project closeout submittal, it shall be returned to the Contractor for correction and modification.
   2. The Contractor shall then submit his revised and corrected project closeout submittals to the Owner for review and approval.
   3. The Contractor shall continue to revise and resubmit project closeout submittals until all required submittals have been accepted by the Owner.
   4. The Contractor will forward approved project closeout submittals to the Owner prior to the Substantial Completion Inspection.
   5. Corrections or modifications of Project Closeout Submittals shall not be used as justification for an extension of Time.

C. Submit closeout submittals under provisions of "Submittal Procedures", with content and in formats specified within this Section and elsewhere in the Construction Documents.

1.4 OPERATION AND MAINTENANCE DATA

A. Quality Assurance:
   1. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Organization: Unless otherwise indicated, organize each manual into separate sections. Each manual shall contain the following materials, in the order listed:
   1. Title page.
   2. Table of contents.
   3. Manual contents.

C. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name, address, and telephone number of Contractor.
   6. Name and address of Architect.
   7. Cross-reference to related systems in other operation and maintenance manuals.

D. Format:
   1. Prepare data in the form of an instructional manual.
   2. Bind in commercial quality 8-1/2 inch x 11 inch three D side ring binders with durable plastic covers, 3 inch maximum ring size:
      a. When multiple binders are used, correlate data into related consistent groupings.
      b. Provide sheet lifters for front and back of binder.
      c. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
      d. Index Tab Dividers:
         1) Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
         2) Provide index tab sheet identified as “Contents” in front of the first page of the table of contents to prevent laser printer or copier toner from sticking to vinyl binder.
   3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
   4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
   5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
      a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts. Provide Photo reduced 11” x 17” copies folded in half of the as-built record drawings.
      b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations

E. Contents, Each Volume:
   1. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Project Consultant, Sub-Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
      a. If record documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
   2. For Each Product or System: List names, addresses and telephone numbers of SubContractors and suppliers, including local source of supplies and replacement parts and applicable local maintenance Contractors.

3. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
4. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
5. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
6. Warranties: Bind a copy of each.

F. Manual For Materials and Finishes:
1. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
2. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
3. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
4. Additional Requirements: As specified in individual Product specification sections.
5. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

G. Manual for Equipment and Systems:
1. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
2. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
3. Include color-coded wiring diagrams as installed.
4. Operating Procedures:
    a. Include start-up, break-in, and routine normal operating instructions and sequences.
    b. Include regulation, control, stopping, shutdown, and emergency instructions.
    c. Include summer, winter, and any special operating instructions.
5. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
6. Provide servicing and lubrication schedule, and list of lubricants required.
7. Include manufacturer's printed operation and maintenance instructions.
8. Include sequence of operation by controls manufacturer.
9. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
10. Provide control diagrams by controls manufacturer as installed.
11. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.
12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
13. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
14. Additional Requirements: As specified in individual Product specification sections.
15. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

H. Instruction of Owner Personnel:

1. Provide copies of all instructional materials, including video taped documentation of training sessions or other instructional audio-visual materials, as specified in Division 1 Section "Demonstration and Training" and other locations in the Construction Documents.
2. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

I. Submittals:
1. Review Copy:
   a. Submit 1 copy of completed volumes (30) days prior to submitting Contractor's Request for Substantial Completion Inspection.
   b. This copy will be reviewed and returned with comments by the Owner, and other Owner consulting reviewers as applicable.
   c. Revise content of all document sets as required by comments provide by the Owner prior to final submission.
2. Final Submittals:
   a. Submit (1) set of revised final volumes in final form prior to submitting Contractor’s Request for Substantial Completion Inspection.
   b. In additional to hard copies, scan and submit (1) set of the closeout documents on a flash drive in PDF format.

1.5 MAINTENANCE MATERIALS

A. Submit maintenance materials, equipment and accessories of the types and in the quantities specified within the respective specification Sections of Divisions 1 through 16.

B. Provide maintenance materials, equipment and accessories in original manufacturer’s packaging with manufacturer’s original, clearly legible labeling.

C. Coordinate delivery date and final storage location of maintenance materials, equipment and accessories with the Owner prior to submittal of Contractor's Request for Substantial Completion Inspection.

D. Do not utilize maintenance materials or equipment for cleaning, maintenance or other Contractor operations.

E. Test and inspect maintenance materials, equipment and accessories to ensure operability, fitness for purpose and new condition prior to submitting to the Owner.

1.6 PRODUCT WARRANTIES

A. Summary:
1. This article specifies general administrative and procedural requirements for warranties required by the Construction Documents, including manufacturers standard warranties on products and special warranties.
   a. Refer to the Construction Documents for terms of the Contractor's special warranty of workmanship and materials.
   b. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions 2 through 16.
2. Disclaimers and Limitations: Manufacturer's exclusions, disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. Definitions:

1. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
2. Special Warranties:
    a. Are written warranties required by or incorporated in the Construction Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.
    b. Refer to individual Sections of Divisions 1 through 16 for specific content requirements, standard form documents, and particular requirements for submittal of special warranties.

C. Warranty Requirements
1. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
2. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
3. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Construction Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
4. Owner’s Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
5. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Design-Build Criteria Package and Construction Documents.
6. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

D. Submittals:
1. Draft Copies:
    a. When a warranty document is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for approval.
    b. Forms for special warranties are included in the Project Manual in the respective Sections of Divisions 1 through 16 or are available through the Project Consultant. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the Owner for approval.
    c. Submit draft copies of all proposed final warranty documents to the Architect under provisions of Division 1 Section "Submittal Procedures", for the Owner’s review.
    d. Edit warranty documents to make them project specific for the Owner.
    e. Remove exclusions, disclaimers and limitations on product warranties not allowed by the Construction Documents.
    f. Include terms and conditions in addition to the “standard” warranty as may be required by the Construction Documents.
    g. Catalog copies or other “sample” warranty forms not presented in project specific format for the Owner shall be resubmitted.

2. Form of Submittal:

a. Prior to Substantial Completion compile (5) five copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer.
b. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
c. Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers, 3 inch maximum ring size:
    1) Provide sheet lifters for front and back of binder.
    2) Cover: Identify each binder with typed or printed title WARRANTIES with title of Project; name, address and telephone number of Contractor and name of responsible company principal.
    3) Table of Contents:
        a) Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
        b) Provide index tab sheet identified as “Contents” in front of the first page of the table of contents to prevent laser printer or copier toner from sticking to vinyl binder.
    4) Separate each warranty with index tab sheets keyed to the Table of Contents listing.
        a) Provide full information, using separate typed sheets as necessary.
        b) List subcontractor / Builder, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
d. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty documents, as necessary, for inclusion in each required manual.

E. Timing of Submittals:
1. Draft warranty documents: Submit with shop drawings, product data or samples as otherwise required for the specified product. If no other submittals are required for a specific product, submit required draft warranty documents in a timely manner prior to delivery and installation of the product on the site.
2. Submit final warranty documents to the Architect & Owner not later than (7) days after the date of Substantial Completion for the Work or a portion thereof as established on the Project Consultant’s executed Consultant's Letter Establishing Substantial Completion Date.
3. If the Owner's executed Letter Establishing Substantial Completion Date designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Owner.
4. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within (7) days of completion of that designated portion of the Work.

1.7 PROJECT RECORD DOCUMENTS

A. General Requirements:
1. Do not use record documents for construction purposes.
2. Protect from deterioration and loss in a secure, fire resistive location.
3. Provide access to record documents for reference by the Architect, the Owner, and other Owner related personnel during normal working hours.
4. Make project record documents available for inspection by jurisdictional authorities at all times.
5. Ensure special protection of project record documents

B. Maintain at the site for the Owner one record copy of:
1. Drawings.
2. Specifications.
3. Addenda.

4. Change Orders, Project Consultant’s Supplementary Instructions and other modifications to the Contract.
5. Approved submittals including all administrative submittals as may be required in the Project Manual.
6. Field Test Records and Reports.
7. Construction Photographs.

C. Maintenance of Project Record Documents:
1. Store documents, samples in Contractor's field office apart from documents used for construction.
   a. Provide fire resistive files and racks for storage of documents.
   b. Provide locked fire resistive cabinets or secure storage spaces for storage of samples.
2. Filing Organization:
   a. File information concerning individual products according to the 1995 edition of MasterFormat as published by the Construction Specifications Institute.
   b. File information concerning assemblies and systems according to the CSI/CSC UniFormat as published by the Construction Specifications Institute, edition current upon Notice to Proceed date.
3. Maintain documents in a clean, dry, legible condition and in good order.

D. Record Drawings:
1. Maintain a clean, undamaged set of blue or black line on white prints of Construction Documents and Shop Drawings.
2. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown.
3. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Construction Documents.
4. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
5. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
6. Mark new information that is important to the Owner, but was not shown on Construction Documents or Shop Drawings.
7. Note related Change Order numbers where applicable.
8. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
9. Content: Types of items requiring marking include, but are not limited to, the following:
   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Depths of foundations below first floor.
   d. Locations and depths of underground utilities.
   e. Revisions to routing of piping and conduits.
   f. Revisions to electrical circuitry.
   g. Actual equipment locations.
   h. Duct size and routing.
   i. Locations of concealed internal utilities.
   j. Changes made by Change Order or Construction Change Directive.
   k. Changes made following Architect's written orders.
   l. Details not on the original Construction Documents.
   m. Field records for variable and concealed conditions.
   n. Record information on the Work that is shown only schematically.

E. Record Specifications:
1. Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction.

2. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
3. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
4. Note related record drawing information and Product Data.
5. Upon completion of the Work, submit record Specifications for the Owner's records.

F. Record Product Data:
1. Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted.
2. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.
3. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation.
4. Note related Change Orders and markup of record drawings and Specifications.
5. Upon completion of markup, submit complete set of record Product Data for the Owner 's records.

G. Record Testing Data / Certifications
1. Record Testing Data / Certifications: Contractor shall submit (1) set of signed and sealed reports prepared during the course of the construction. Testing Data shall include, but not limited to:
   a. Soils compaction and density.
   b. Concrete cylinder tests.
   c. Structural threshold inspector in-progress inspections.
   d. Structural threshold inspector final structural certifications.
   e. Structural welding certification.
   f. Insulation certification.
   g. As-built site lighting photometric plan.
   h. Mechanical test and balance report.
   i. Surge protection certification.
   j. Flood plain elevation certification.

H. Record Sample Submitted:
1. Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes.
2. Comply with delivery to the Owner's Sample storage area.

I. Record Cad As-Built Drawings:
1. Update all Electronic Construction Document CAD Drawings for all construction deviations and submit copies of the drawings to the Owner in native CAD and PDF formats.
   a. All redline markup shown on the field record set shall be incorporated into the electronic files at the end of the construction phase.
   b. Include Civil As-built final survey with site and utility improvements.

J. Miscellaneous Record Submittals:
1. Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work.
2. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference.
3. Submit to Owner for their records.

1.8 SPARE PARTS

A. Submit spare parts and related accessories of the types and in the quantities specified within the respective specification Sections of Divisions 1 through 16.

B. Provide spare parts in original manufacturer’s packaging with manufacturer’s original, clearly legible labeling.

C. Coordinate delivery date and final storage location of spare parts through the Architect prior to submittal of Contractor's Request for Substantial Completion Inspection.

D. Do not utilize spare parts for any purpose during construction.

E. Test and inspect spare parts to ensure operability, fitness for purpose and new condition prior to submitting to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01780

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Record Testing Data / Certifications

B. Related Sections include the following:

1. Division 1 Section "Closeout Procedures" for general closeout procedures.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Electronic Copies: Submit two (2) Flash Drives – each containing (1) set of scanned marked-up Record Prints in PDF format.

B. Record Specifications: Comply with the following:
1. Number of Electronic Copies: Submit two (2) Flash Drives – each containing (1) set of scanned Project's Specifications, including addenda and contract modifications in PDF format.

C. Record Product Data: Comply with the following:
1. Number of Electronic Copies: Submit two (2) Flash Drives – each containing (1) set of scanned each Product Data submittal in PDF format.
2. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

D. Record Testing Data: Comply with the following:
1. Number of Electronic Copies: Submit two (2) Flash Drives – each containing (1) set of scanned each Test Data submittal in PDF format.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Owner determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Owner for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.

3. Identification: As follows:

   a. Project name.
   b. Date.
   c. Designation "PROJECT RECORD DRAWINGS."
   d. Name of Architect.
   e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
   5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

3.2 RECORD DOCUMENTATION MANUAL

A. Organization: Include a section in the manual for each of the following:
   1. Table of Contents.
   2. Record Drawings.
   3. Record Specifications.
   4. Record Product Data.
   5. Record Testing Data / Certification.
   6. Miscellaneous Record Submittals.

B. Tables of Contents: Include a table of contents for each record manual.

3.3 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into separate sections. Each manual shall contain the following materials, in the order listed:

   1. Title page.
   2. Table of contents.
   3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name, address, and telephone number of Contractor.
   6. Name and address of Architect.
   7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

   1. If record documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically.

   1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

      a. If two or more binders are necessary to accommodate data, organize data in each binder into groupings by sections.
      b. Identify each binder on front and spine, with printed title "RECORD DOCUMENTATION MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

   2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
   3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
   4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.

5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts. Provide Photo reduced 11 x 17 copies folded in half of the as-built record drawings.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

END OF SECTION 01781

SECTION 01820 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Demonstration and training videos.

B. Related Sections include the following:
   1. Divisions 2 through 9 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Attendance Record: For each training module, submit list of participants and length of instruction time.

B. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

C. Demonstration and Training Videos: Submit two copies within seven days of end of each training module.
   1. Identification: On each copy, provide an applied label with the following information:
      a. Name of Project.
      b. Name and address of photographer.
      c. Name of Architect.
      d. Name of Contractor.
      e. Date videotape was recorded.
      f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section 01400 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Owner.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
   1. Synthetic turf field system, including maintenance and care procedures.
   2. Shade systems.
   3. Electrical service and distribution, including transformers, switchboards, panelboards, uninterruptible power supplies, and motor controls.
   4. Lighting equipment and controls system.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
   1. Documentation: Review the following items in detail:
      a. Emergency manuals.
      b. Operations manuals.
      c. Maintenance manuals.
      d. Project Record Documents.
      e. Identification systems.
      f. Warranties and bonds.
      g. Maintenance service agreements and similar continuing commitments.
   2. Emergencies: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.
      e. Sequences for electric or electronic systems.
      f. Special operating instructions and procedures.
   3. Operations: Include the following, as applicable:
      a. Startup procedures.
      b. Equipment or system break-in procedures.
      c. Routine and normal operating instructions.
      d. Regulation and control procedures.
      e. Control sequences.
      f. Safety procedures.
      g. Instructions on stopping.
      h. Normal shutdown instructions.
      i. Operating procedures for emergencies.
      j. Operating procedures for system, subsystem, or equipment failure.
      k. Seasonal and weekend operating instructions.
      l. Required sequences for electric or electronic systems.

m. Special operating instructions and procedures.

4. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.
5. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
6. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
7. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Schedule training with Owner with at least seven days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a written and a demonstration performance-based test.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEOS

A. General: Engage a qualified commercial photographer to record demonstration and training videotapes. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
   1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Format: Provide videos in AVI, MWV, MOV or MP4 format with minimum 1080p resolution for each training session on a Flash Drive.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

END OF SECTION

SECTION 02010 – SUBSURFACE INVESTIGATIONS

PART 1 - GENERAL

Applicable provisions of "General Conditions", "Supplementary Conditions", and Division One, govern work under this Section.

DESCRIPTION:

SOILS INFORMATION: A subsoil investigation report; dated May 13, 2022, has been prepared by **Federal Engineering & Testing, Inc.**, hereinafter referred to as the Soils Engineer. This report was obtained only for the Owner's use in design. Its accuracy or completeness is not guaranteed by Owner or Architect and in no event is it to be considered part of the Contract Documents. The report and log of borings follows and is for Contractor's/Construction Manager's information but is not a warrant of subsurface conditions. Neither Owner nor Architect will be responsible in any way for additional compensation for excavation work performed under the Contract due to Contractor's/Construction Manager's assumptions based on sub-soil data prepared solely for Owner's use.

ADDITIONAL INFORMATION: Contractor/Construction Manager should visit the site and become acquainted with existing conditions. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions.

The Contractor/Construction Manager is required to prepare the site for all new construction. Refer to geotechnical report for allowable soil bearing capacity used for the Contract Documents. All organic material will be required to be removed. Submit soil compaction testing report to architect prior to placing concrete.

END OF SECTION

Subsoil Investigation Report

prepared by:

Federal Engineering & Testing, Inc.

Client: City of Pompano Beach Engineering
Contact: Gary Eagle

Address: 1201 NE 5 Avenue
Pompano Beach, FL 33060

Project: 2601 NE 16th Avenue - Gateway Stormwater Improvements

Address: 2601 NE 16th Avenue
Pompano Beach, FL 33064

Date: Friday, May 13, 2022

FEDERAL ENGINEERING & TESTING, INC.
30+ YEARS OF EXCELLENCE
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Geotechnical | Materials Testing | Inspections | Environmental

Federal Engineering & Testing, Inc.
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Table of Contents

For Your Information

Our findings in this report are based on soil conditions encountered in the test bore locations only, proposed structure to be built, (if available at this stage), Florida Building Code requirements and standard engineering practices. If your report is preliminary (i.e. vacant land or building to be demolished) additional borings are required within the foot print of the proposed structure once the location & layout of the proposed structure is known.

Please read this report in its entirety and follow all recommendations. Failure to do so may result in the permitting agency (Building Department, etc.) withholding the Certificate of Occupancy. This will cause delays and additional costs. The Permitting Agency will require a final certification or signing off of the project prior to issuing the Certificate of Occupancy. All of our recommendations need to be followed to receive a final certification from F.E.T., including densities on each lift, demucking verification, piling inspection, etc., whichever recommendation applies to your project.

Please schedule us at least 24 hours in advance for all tests and inspections. If you choose to use another Engineering Firm, you must verify they will provide you with the proper certification in writing, as outlined in our report. Our firm will only provide a certification letter if it has verified all work as recommended in our report.

Federal Engineering & Testing, Inc.
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admin@fed-eng.com
www.fed-eng.com
3370 NE 5th Avenue Oakland Park, Florida 33334

Friday, May 13, 2022 Job Order Number 22SB0307

City of Pompano Beach Engineering
1201 NE 5 Avenue
Pompano Beach, FL 33060
Attn.: Gary Eagle

RE: **Subsoil Investigation**
2601 NE 16th Avenue - Gateway Stormwater Improvements
2601 NE 16th Avenue
Pompano Beach, FL 33064

Dear Sirs:

Pursuant to your request, Federal Engineering & Testing, Inc. has completed a subsoil investigation on 5/10/2022 at the above referenced site. The purpose of our investigation was to verify subsoil conditions relative to foundation preparation and design.

A total of one (1) SPT boring was performed according to ASTM D-1586 drilled down to a depth of twenty-five feet (25) below the existing ground surface. (See attached field sketch for locations). The following is a general description of soil stratas for the subject site:

Depth From	Depth To	Description of Soils
0"	6"	Topsoil & Vegetation
6"	4'	Pale Brown Sand with Rock
4'	15'	Brown Sand with Trace of Rock
15'	20'	Light Brown Sand
20'	25'	Pale Brown Sand

Groundwater table elevation was measured immediately at the completion of each boring and was found at an average depth of six (6) feet below existing ground surface. Fluctuation in water level should be anticipated due to seasonal variations and run off as well as varying ground elevation, construction dewatering and pumping activities in the area. Site contractor must familiarize himself with site conditions in the event groundwater controls and dewatering is needed. Surface flooding may result under hurricane conditions and should be taken into consideration in the design of the project. The contractor shall make sure that groundwater levels on adjacent properties are not affected by the contractors dewatering activities. Specialty groundwater contractors shall be consulted for all work below the groundwater level.

The boring log(s) attached present a detailed description of the soils encountered at each location. The soil stratification shown on the boring log(s) is based on the examination of the recovered soil samples and interpretation of the driller's field log(s). It indicates only the approximate boundaries between soil types. The actual transitions between adjacent soil types may be gradual.

From a geotechnical engineering perspective, the site is suitable for the construction of the proposed structure, provided that the surface sand layers are compacted in place and proof rolled. Localized areas of loose materials, if present, will become evident during site clearing, grubbing and proof rolling, and must be removed prior to filling operations.

Based on our understanding of the proposed structure and the information obtained from our field boring log(s); we recommend the following procedures for foundation design:

1) Strip the entire footings and building construction areas plus five (5) feet past the outer perimeter of topsoil and ground vegetation (when encountered) down to clean granular material. Any underground structures, utility lines, root systems and drainage trenches, etc. must be removed in their entirety from beneath the proposed construction areas. The city arborists should be contacted prior to any land clearing to verify compliance with any local codes.

2) Saturate and compact all construction areas with a heavy self propelled vibratory roller to a minimum of 95% of the ASTM D-1557 modified proctor method. Make a minimum of ten (10) passes with the roller in each direction.

3) Care should be taken when using vibration in case of existing structures in the vicinity of the construction area. If vibration cannot be used for compaction, static compaction may be applied. However, in this case, the compacted layer should not exceed 6 inches in thickness.

4) Backfill construction areas to proper elevation if needed using a clean granular material placed in lifts not to exceed twelve (12) inches in thickness and compacted as per item 2.

5) Representative samples of the on-site and proposed fill material should be collected and tested to determine the classification and compaction characteristics.

6) All construction fill material above the water table shall be clean granular soil, free of organics or other deleterious material, and shall contain no more than twelve (12) percent fines passing a U.S. Standard No. 200 sieve (0.075mm) and have a Unified Soil Classification (USCS) designation of GP, GW, GP-GM, GW-GM, SP or SW. No particle size greater than three (3) inches shall be used in the top 12 inches of the building pad.

7) Fill Material below the water table shall be washed free draining gravel such as FDOT No. 57 stone or equivalent to about 12 inches above the water table unless dewatering is used. When dewatering is used, fill material shall be clean granular soil, free of organics or other deleterious material, and shall contain no more than twelve (12) percent fines passing a U.S. Standard No. 200 sieve (0.075mm).

8) Verify all densification procedures by taking an adequate number of field density tests in each layer of compacted material. Density tests shall be performed on the slab areas, footing areas, interior bearing wall footings and column pad footings. This must be scheduled immediately after Tamp and Spray and/or Compaction, but before Reinforcing Steel Placement. If reinforcing steel is already in-place, it must be removed from all areas to be tested prior to performing densities.

9) After the installation of any plumbing and electrical piping; we recommend that the disturbed area be recompacted and additional densities tests be performed to verify proper compaction of the disturbed areas.

10) All of the above Geotechnical work shall be performed under the supervision of Federal Engineering & Testing's geotechnical engineer or his representative to verify compliance with our specifications and the Florida Building Code. Please call us at 954-784-2941 for scheduling.

11) In the event of existing structures, existing footings or proposed drainage lines, provisions shall be made by the structural engineer and site contractor to protect all footings from undermining and exposure. The geotechnical engineer shall be notified of these conditions to evaluate the applicability of his recommendations.

The above foundation recommendations being achieved and verified; it is our opinion that the proposed structure be designed for a shallow foundation system with a permissible soil bearing pressure not to exceed 2500 P.S.F. Building pad certification requires satisfactory completion and verification of all the above foundation recommendations.

Slabs placed upon compacted fill may be designed using a modulus of subgrade reaction value of 200 pci. The following soil parameters shall be used for retaining wall designs:

- Soil unit weight moist---------- 110 pcf
- Soil unit weight buoyant---------- 48 pcf
- Angle of internal friction---------- 30º
- Active Earth pressure coefficient (Ka)---------- 0.33
- Passive Earth pressure coefficient (Kp)---------- 3.0
- Angle of wall friction for steel piles---------- 30º
- Angle of wall friction for concrete / brick walls---------- 20º
- Angle of wall friction for uncoated steel---------- 15º

Excavations shall not extend within one (1) foot of the angle of repose next to existing footings or structures unless underpinned. Trenching shall be in compliance with the Florida Building Code, OSHA and Trench Safety Act requirements. Shorings shall be designed and inspected by a Florida licensed professional engineer.

Provisions shall be made by the architect, engineer of record and contractor to address differential settlements when tying in new to existing structures. Mixing of different foundation types shall not be used unless provided with expansion joints to address differential settlement.

Federal Engineering & Testing, Inc.

Detailed settlement analysis was beyond the scope of this report. Comparing the field test data obtained in this exploration with our experience with structures similar to those proposed for this project, the estimated magnitude of these settlements is 0.5 to 1 inch. Due to the granular nature of the subsurface materials, the foundation settlements should occur as the loads are applied and should be virtually negligible by the end of the building shell completion.

All outside ground surfaces must be sloped away from the structure to avoid water accumulation and ponding. All rain waters shall be discharged away from all building foundations. Verify all water, sewer, plumbing, sprinkler and drainage lines are properly functioning with no leaks in the vicinity of the foundation.

Regardless of the thoroughness of a geotechnical exploration, there is always the possibility that conditions may be different from those of the test locations; therefore, Federal Engineering & Testing, Inc. does not guarantee any subsoil condition between the bore test holes. A site plan showing the location of the proposed structure was provided at the time the soil borings were performed. Once plans and specifications have been finalized and drawn, Federal Engineering & Testing, Inc. shall be provided a copy of the finalized plans and specifications for review. For a more accurate portrayal of subsurface conditions, the site contractor should perform test pits. If different conditions are encountered, Federal Engineering & Testing Inc., shall be notified to review the findings and make any recommendations as needed. In accepting this report the client understands that all data from the soil borings is intended for foundation analysis only and is not to be used for excavating, backfilling or pricing estimates. The site contractor must familiarize themselves with the job site conditions.

Environmental analysis of the soil materials is not part of the scope of services. If environmental analysis of the soils is required, we can provide a proposal for performing an environmental analysis of the soil materials. For Environmental due diligence, a Phase I and/or Phase II Environmental Site Assessment is recommended.

As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Federal Engineering & Testing, Inc. appreciates the opportunity to be of service to you at this phase of your project. Please feel free to contact us if we may be of further service to you.

This item has been electronically signed and sealed by Keith LeBlanc, P.E. on the date adjacent to the seal using a digital signature.

Printed copies of this document are not considered signed and sealed and the digital signature must be verified on any electronic copies.

Appendices

Federal Engineering & Testing, Inc.
Phone: 954-784-2941
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www.fed-eng.com
3370 NE 5th Avenue Oakland Park, Florida 33334

SPT Test Boring Report

Client: City of Pompano Beach Engineering
Project: 2601 NE 16th Avenue - Gateway Stormwater Improvements
Address: 2601 NE 16th Avenue
Pompano Beach, FL 33064

Date of Test: May 10, 2022
Hole No.: B-1
Location: See Attached Drawing

Depth (FT)	Soil Descriptions		Hammer Blows		"N"
1	0" - 6"	Topsoil & Vegetation	1	1	2
2			1	2	
3	6" - 4'	Pale Brown Sand with Rock	1	2	5
4			3	3	
5			2	1	3
6			2	5	
7			4	5	11
8			6	4	
9			3	4	9
10	4' - 15'	Brown Sand with Trace of Rock	5	6	
11			A	A	A
12			A	A	
13			A	A	A
14			A	A	
15			7	6	12
16			6	5	
17			A	A	A
18	15' - 20'	Light Brown Sand	A	A	
19			A	A	A
20			A	A	
21			5	6	12
22			6	7	
23	20' - 25'	Pale Brown Sand	A	A	A
24			A	A	
25			A	A	
26					
27					
28					
29					
30					

Water Level: 6'6" Below Land Surface

A = Auger

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3370 NE 5th Avenue Oakland Park, Florida 33334

Usual Open Hole Test

Date: Tuesday, May 10, 2022 Job Order Number 22SB0307

City of Pompano Beach Engineering
1201 NE 5 Avenue
Pompano Beach, FL 33060
Attn.: Gary Eagle

RE: **Engineering Services**
2601 NE 16th Avenue - Gateway Stormwater Improvements
2601 NE 16th Avenue
Pompano Beach, FL 33064

Results of Test

Tested by:	SN	Reported to:	Client
Diameter of Hole:	8"	Depth of Hole:	10'
Tested Location:	See Attached Site Sketch EX-1		

Subsurface Investigation

Gallons/ Minutes	Elapsed Time in Minutes
4	1
3.9	2
3.8	3
3.7	4
3.7	5
3.7	10

Depth Below Ground Surface	Soil Description
0" - 6"	Asphalt
6" - 2'	Pale Brown Sand with Rock
2' - 4'	Light Gray Sand
4' - 10'	Brown Sand

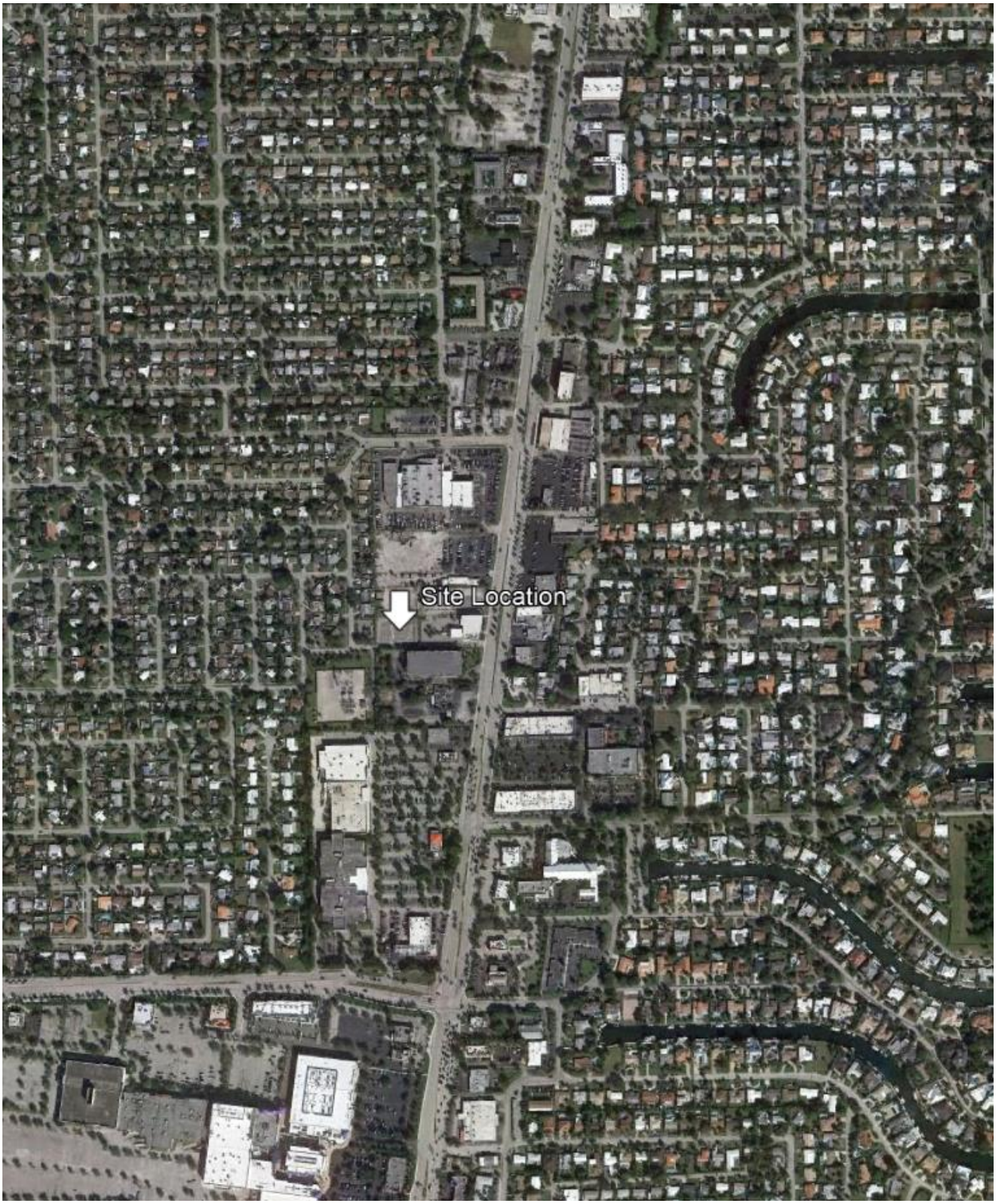
Water Table Elevation: 6'6" Below existing ground Surface

Hydraulic Conductivity: K= **8.76×10^{-5}** CFS/FT^2 - FT. HEAD

The above hydraulic conductivity represents an ultimate value. The designer should decide on the required safety factor. This value is based on the existing soils at the location of the test.

Tested By: SJ
Checked By: KL

Federal Engineering & Testing, Inc.



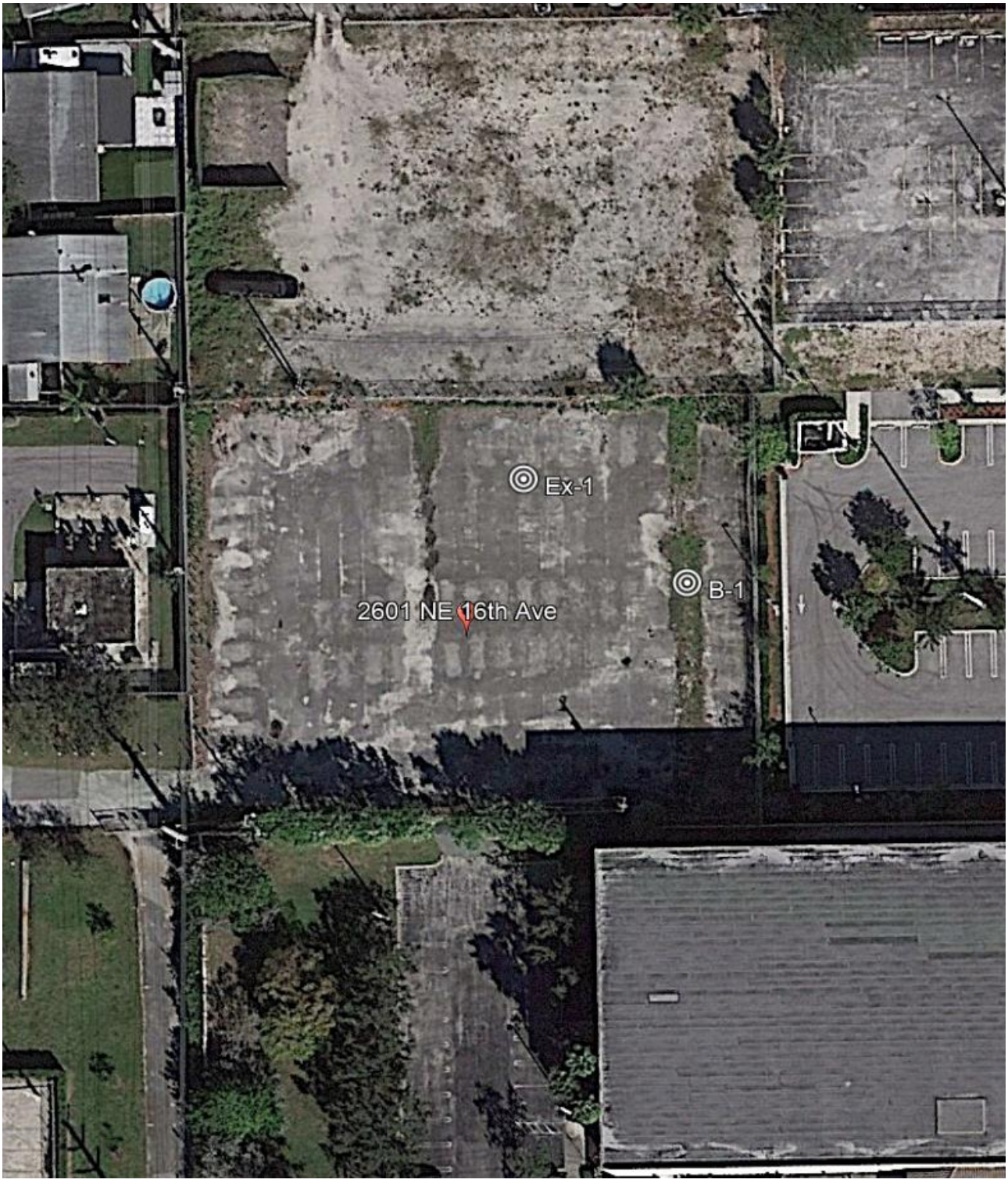
Site Location Map

Federal Engineering & Testing Inc. 3370 NE 5th Avenue, Oakland Park, FL 33334 (954) 784-2941

Client: City of Pompano Beach Engineering
Test: Subsoil Investigation
(site map is not to scale)

Project: 2601 NE 16th Avenue - Gateway Stormwater I
Project Address: 2601 NE 16th Avenue
Pompano Beach, FL 33064

Federal Engineering & Testing, Inc.



Soil Boring Location Map

Federal Engineering & Testing Inc. 3370 NE 5th Avenue, Oakland Park, FL 33334 (954) 784-2941

Client: City of Pompano Beach Engineering
Test: Subsoil Investigation
(site map is not to scale)

Project: 2601 NE 16th Avenue - Gateway Stormwater I
Project Address: 2601 NE 16th Avenue
Pompano Beach, FL 33064

Federal Engineering & Testing, Inc.

Soil Classifications

Correlation of Penetration Resistance with Relative Density and Consistency		
Sands		
Dynamic Cone Penetrometer *Penetrometer Resistance*	Standard Penetration *Hammer Blows*	Relative Density
0 - 10	0 - 4	Very Loose
11 - 25	5 - 10	Loose
26 - 45	11 - 20	Firm
45 - 75	21 - 30	Very Firm
76 -120	31 - 50	Dense
> 120	> 50	Very Dense

Silts & Clay		
Dynamic Cone Penetrometer *Penetrometer Resistance*	Standard Penetration *Hammer Blows*	Relative Density
0 - 6	0 - 2	Very Soft
7 - 15	3 - 5	Soft
16 - 30	6 - 10	Firm
31 - 45	11 - 15	Stiff
46 - 90	16 - 30	Very Stiff
91 - 150	31 - 50	Hard

Rock Hardness Description	
Soft	Rock core crumbles when handled
Medium	Can break core with your hands
Moderately Hard	Thin edges of rock core can be broken with fingers
Hard	Thin edges of rock core cannot be broken with fingers
Very Hard	Rock core rings when struck with a hammer

Sand Quantity Modifiers	
Very Slight Trace	0 - 2 %
Slight Trace	2 - 5 %
Trace	5 - 10 %
Little Trace	10 - 15 %
Some	15 - 30 %
With	> 30 %

Particle Size	
Boulder	> 12 in
Cobble	3 - 12 in
Gravel	4.76 mm - 3 in
Sand	0.074 mm - 4.76 mm
Silt	0.005 mm - 0.074 mm
Clay	< 0.005 mm

Silt - Clay Quantity Modifiers	
Slightly Silty /Clayey	0 - 5 %
Silty / Clayey	5 - 30 %
Very Silty / Clayey	30 - 50 %

Federal Engineering & Testing, Inc.

Drilling & Sampling Procedures

The soil borings were installed in accordance with Standard Penetration Tests procedures as set forth in ASTM D-1586. Representative samples were collected utilizing spilt-barrel techniques in accordance with the procedures set forth in "Penetration Tests and Spilt-Barrel Sampling of Soil in ASTM D-1586. The following field tests, measurements and laboratory analysis were performed/collected during the installation of each soil boring.

Penetration Tests

During the sampling procedures, Standard Penetration Tests were performed at five (5) foot intervals to obtain the standard penetration value (N) of the subsurface soil. The standard penetration value (N) is identified as the number of blows of a 140-pound hammer falling thirty (30) inches, required to advance the spilt-barrel sampler one (1) foot into the subsurface soil. The sampler was lower into the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows was recorded for each of the three (3) successive increments of six (6) inches penetration. The "N" value is obtained by adding the second and third incremental numbers.

Water Level Measurements

Water Level depths were obtained during the test boring operations. In relatively pervious soils, such as sandy soils, the indicated depths are usually reliable groundwater levels. Seasonal variations, tidal conditions, temperature, land-use and recent rainfall conditions may influence the depths to groundwater levels.

Soil Properties / Classification

All samples collected were classified in accordance with the Unified Soil Classification System criteria to determined soil material properties and compared with published literature of the USDA Soil Conservation Survey.

Ground Surface Elevations

Ground surface elevations have not been provided for the proposed boring locations. Therefore, all references to depth of the various strata and materials encountered were from existing grade at the time of the drilling operations.

Limitations of Liability

Warranty

We warrant that the services performed by Federal Engineering and Testing, Inc. (F.E.T.) are conducted in a manner consistent with the level of skill and care ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranties, expressed or implied, are made. While the services of F.E.T. are an integral and valuable part of the design and construction process, we do not warrant, guarantee, or insure the quality or completeness of services or satisfactory performance provided by other members of the construction process and/or the construction plans and specifications which we have not prepared, nor the ultimate performance of building site materials. As mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. Reports are not intended for 3rd party use.

Subsurface Exploration

Subsurface exploration is normally accomplished by test borings. The soil boring log includes sampling information, description of the materials recovered, approximate depths of boundaries between soil and rock strata and groundwater data. The log represents conditions specifically at the location and time the boring was made. The boundaries between different soil strata are indicated at specific depths; however, these depths are in fact approximate and dependent upon the frequency of sampling. The transitions between soil stratum are often gradual. Water level readings are made at the time the boring was performed and can change with time, precipitation, canal levels, local well drawdown, and other factors. Regardless of the thoroughness of a Geotechnical exploration there is always a possibility that conditions may be different from those of the test locations; therefore F.E.T. does not guarantee any subsoil condition surrounding the bore test holes. For a more accurate portrayal of subsurface conditions, the site contractor should perform tests pits. If different conditions are encountered, F.E.T. shall be notified to review the findings and make any recommendations as needed.

Laboratory and Field Tests

Tests are performed in accordance with specific ASTM Standards unless otherwise indicated. All criteria included in a given ASTM Standard are not always required and performed. Each test report indicates the measurements and determinations actually made.

Ownership of Tests / Reports

All test results and/or reports prepared by F.E.T. pursuant to this agreement and/or Addendum(s) thereto, shall remain the property of F.E.T. until all monies due and owing to F.E.T. under this Agreement and/or Addendum(s) thereto, are paid in full.

Analysis and Recommendations

The Geotechnical report is prepared primarily to aid in the design of site work and structural foundations. Although the information in the report is expected to be sufficient for these purposes, it is not intended to determine the cost of construction or to stand alone as construction specifications.

Analysis and Recommendations cont.

In accepting this report the client understands that all data from the soil boring is intended for foundation analysis only and is not to be used for excavating, backfilling or pricing estimates. In accepting this report the client understands that all data from the soil boring is intended for foundation analysis only and is not to be used for excavating, backfilling or pricing estimates. The site contractor must familiarize themselves with the job site conditions. Soil boring(s) on unmarked vacant property or existing structure(s) to be demolished is considered preliminary with further boring(s) to be performed after proposed building pad is staked out. Report recommendations are based primarily on data from test borings made at the locations shown on the test boring reports. Soil variations may exist between borings and may not become evident until construction. If variations are then noted, F.E.T. must be contacted so that field conditions can be examined and recommendations revised if necessary. The Geotechnical report states our understanding as to the location, dimensions, and structural features proposed of the site. Any significant changes in the nature, design, or location of the site improvements must be communicated to F.E.T. so that the Geotechnical analysis, conclusions, and recommendations can be appropriately adjusted.

Construction Observations

Construction observation and testing is an important element of Geotechnical services. The Geotechnical Engineer's Field Representative (Field Rep.) is the "owner's representative" observing the work of the contractor, performing tests, and reporting data from such tests and observations. The Geotechnical Engineer's Field Representative does not direct the contractor's construction means, methods, operations, or personnel. The Field Rep. does not interfere with the relationship between the owner and the contractor, and except as an observer, does not become a substitute owner on site. The Field Rep. is only collecting data for our Engineer to review. The Field Rep. is responsible for his/her safety only, but has no responsibility for the safety of other personnel and/or the general public at the site. If the Field Rep. does not feel that the site is offering a safe environment for him/her, the Field Rep. will stop his/her observation/ testing until he/she deems the site is safe. The Field Rep. is an important member of a team whose responsibility is to observe the test and work being done and report to the client whether that work is being carried out in general conformance with the plans and specifications.

Limitations of Report

Federal Engineering & Testing, Inc. shall have no liability, in contract, tort or otherwise, for any inaccuracy, defect, or omission in interpreting this report and shall not in any event have any liability for lost profits or any other indirect, special, incidental, consequential, exemplary or punitive damages. In the event of future conflict between owners and contractors the following applies: F.E.T.(s) legal and/or company representation and preparation for representation fees will be billed on an hourly rate, i.e. deposition, expert witness, etc. F.E.T. has no obligation to amend its conclusions or recommendations after the date of this report. Any alterations or changes in the location of the project should be brought to our attention at the earliest convenience for review and applicability of this report.

Federal Engineering & Testing, Inc.

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Partial List of Services

Geotechnical Engineering Services

Soil / Aggregate Tests
Soil Borings
Density Compaction Tests
Grain Size Analysis
Moisture Contents
Soil Classifications
Limerock Bearing Ratios
Florida Bearing Values
Specific Gravity
Carbonate Analysis
Hydraulic Conductivity
Organic Contents
L.A. Abrasion

FDOT Inspections
QC Management
Earthwork Inspections
QC Concrete Inspections
QC Asphalt Inspections

Field Inspection Services
Fill & Quality Control Inspections
Demucking Inspections
Building Inspections
Pile Driving Inspections
Pile Load Tests
Steel Inspection
Threshold Inspection
Bolt Inspection
Weld Inspection
Vibration Monitoring

Geotechnical Engineering
Foundation Engineering
Foundation Design & Recommendation
Subsoil Investigation
Pile Load Calculations
Piling Installation Monitoring

Asphalt Services
Backscatter Density Tests
Extractions & Gradations
Marshall Limits
Bulk Specific Gravity
Cores for Thickness Determination
Asphalt Pavement Monitoring
Asphalt Assessment

Concrete Tests
Concrete Strength Testing
Slump Tests
Windsor Probe Testing
Schmidt Hammer Testing
Core Testing
Air Content
Concrete Unit Weight
Flexual Strength Testing

Environmental Engineering Services

Phase I Site Assessments
Site Inspections
Research of Property Records

Phase II Site Assessments
Phase I Follow up on Contaminated Sites
Installation of Monitoring Wells
Soil Borings
Soil and Ground Water Analysis

Lead Base Paint Surveys
Report and Analysis
Air Monitoring

Roof Testing & Inspection Services

TAS 105 Field Fastener Withdrawal Test
TAS 106 Tile Uplift Test
TAS 124 Bell Chamber / Bonded Pull Test
TAS 126 Moisture Survey
Windload Calculation
Drainage Calculations
Lightweight Concrete placement Inspection
Roof Assessment / Evaluation
Cap Sheet Inspection
Fastener Spacing Inspection
Tile/ Shingle/ Standing Seam Inspection
Base Sheet Installation Inspection
Insurance Mitigation
Retrofit Mitigation/ Certification
Roof Drainage Calculations

CMEC AASHTO R18 Accredited
aci
WOMEN OWNED
MIAMI-DADE COUNTY Approved Laboratory
FDOT

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental Conditions, and other Division 1 Specification Sections, apply to this all sections of specifications.

1.2 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected site elements shown on drawings such as, but not limited to:
      a. Existing fence and bollards.
      b. Existing asphalt paving.
      c. And other items as per the demolition drawings.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be salvaged, or to remain.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition legally at the Contractor's option.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Pre-Demolition Conference: Conduct conference at Project site to comply with the requirements of Division 1.

1.6 PROJECT CONDITIONS

A. This facility is in use every day of the week. There are existing sections that are fully operational. The Contractor is required to perform the needed work for his/her demolition project in a way that does not disturb the function or interrupt ongoing operations of adjacent areas. All work must be coordinated and scheduled with approval from Owner’s staff. The areas not covered by the work must be protected. Any areas damaged or disturbed by the demolition process in any way must be repaired and brought to the condition it was found just prior to commencement of work. Any areas damaged or disturbed by the demolition process must be repaired immediately after happening in order to avoid further damage to the inside of the buildings due to rain or weather. All repairs must be done by the Contractor as part of this

contract and to the complete satisfaction of the Owner. Contractor must take all necessary actions to insure the safety of all occupants and visitors.

B. Contractor shall sequence the project in the manner that will allow Owner the use of their building at all times. Contractor shall clean up at the end of each workday and with thorough cleaning and material / equipment disposal on Fridays in preparation for the weekend.

C. Contractor shall not block any means of egress.

D. Conduct selective demolition so that Owner's operations will not be disrupted. Provide not less than 10 days advance notice to the Owner of activities that will affect their operations.

E. Owner and Consultant assume no responsibility for actual condition of elements to be selectively demolished.
   1. Conditions existing at time of inspection for bidding purpose will be maintained by the Owner as far as practical.

F. Asbestos: When required by the City or any regulatory agency having jurisdiction over this Project, Contractor shall obtain an Asbestos Inspection and Report by a legally licensed company to perform this type of work. Contractor shall carefully read the Asbestos Report and comply with all its recommendations.
   1. Contractor shall hire a certified asbestos abatement contractor to remove all asbestos containing material in accordance with EPA and OSHA regulation.
   2. The asbestos abatement contractor shall supply all labor, material services, insurance, permits and equipment necessary to carry out the work.
   3. Contractor will include in his/her contract all asbestos abatement required by all agencies having jurisdiction over this site.

G. Protections: Provide temporary barricades and other forms of protection to protect all adjacent tenants and general public from injury due to selective demolition work.
   1. Provide protective measures as required to provide free and safe passage of the Owner and tenants and all vehicles and general public to areas affected by demolition.
   2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
   3. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
   4. Protect floors with suitable coverings when necessary.
   5. Provide temporary seals for supply and return diffusers.
   6. Provide temporary seals for electrical or data outlets.
   7. Provide temporary weather protection during demolition to ensure that no water leakage or damage occurs to structure or interior areas of existing structures to remain.
   8. Provide temporary dust and debris barriers of fire resistant materials to control dust and debris and to confine demolition of existing and finished work.
   9. Remove protections at completion of work.

H. Damages: Immediately repair damages caused to adjacent facilities by demolition work.

I. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
   1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without approval from the Owner and providing alternate routes around all closed or obstructed traffic ways.

J. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

K. Explosives:
   1. Use of explosives will not be permitted.

L. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
   1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by the Owner. Provide temporary services during interruptions to existing utilities or schedule work to install interrupted utilities first, as acceptable to the Owner.
   2. Maintain fire protection services during selective demolition operations.

M. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
   1. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.
   2. Provide ventilation to maintain non-toxic unpolluted working area for adjacent Owner's operating areas and construction/ demolition areas. Welding and cutting torches producing smoke or toxic fumes must be adequately ventilated.

N. Special Conditions: The Contractor shall provide labor, materials and equipment to complete the work as by the Contract Documents, including but not limited to the following:
   1. The filing of all required notifications and variances, including the payment of all fees charged by all regulatory agencies.
   2. Work area preparation.
   3. General protection.
   4. Isolation barrier construction.
   5. Re-establishment of all building systems disrupted by the work of this contract.
   6. Repair or replacement, to the Owner's satisfaction, of any existing finishes, construction or other building components damaged during the work.
   7. Conduct daily inspections of all adjacent spaces and clean up as required.

1.7 SCHEDULING

A. Arrange selective demolition schedule so as not to interfere with the operations of the users of the building.

1.8 WARRANTY

A. Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equal or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

C. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Owner.

D. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

E. Locate all existing utilities within project limits prior to any demolition.

3.2 OWNER'S FURNISHINGS AND EQUIPMENT

A. Provide not less than 10 days advance notice to the Owner of activities that will affect their operations.

3.3 PREPARATION

A. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
   1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by the Owner, or as shown on drawings.
   2. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.
   3. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

B. Protect existing site improvements, appurtenances, and landscaping to remain.
   1. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

C. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

3.4 ENVIRONMENTAL CONTROLS

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

3.5 SELECTIVE DEMOLITION

A. Demolish and remove existing construction only to the extent required and as indicated in drawings. Use methods required to complete Work within limitations of governing regulations and as follows:
   1. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
   2. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Owner in written, accurate detail. Pending receipt of directive from the Owner, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.6 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

C. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

D. Disposal: Transport demolished materials from Owner's property and legally dispose of them.

3.8 CLEANUP AND REPAIR

A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior adjacent areas broom clean.
   1. Repair demolition performed in excess of that required. Return adjacent elements of building and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

3.9 SELECTIVE DEMOLITION SCHEDULE

A. General: furnish schedule for demolition to obtain approval from the Owner.

END OF SECTION

SECTION 02200 - PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections include the following:
   1. Division 1 Section "Construction Waste Management."

1.3 DESCRIPTION

A. Provide erosion control measures on the project site and in areas outside the limits of construction where work is accomplished in conjunction with the project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the project site and damage to work on the project. Construct and maintain temporary erosion control features or, where practical, construct and maintain permanent erosion control features as shown in the plans or as may be directed by the Owner.

B. Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution throughout the life of the Contract.

1.4 CONTROL OF CONTRACTOR'S OPERATIONS

A. Prevent pollution of streams, canals, lakes, reservoirs, and other water impoundments with fuels, oils, bitumens, calcium chloride, or other harmful materials. Also, conduct and schedule operations to avoid or otherwise minimize pollution or siltation of such water impoundments, and to avoid interference with movement of migratory fish. Do not dump any residue from dust collectors or washers into any live stream or lake.

B. Restrict construction operations in rivers, streams, lakes, tidal waters, reservoirs, canals, and other water impoundments to those areas where it is necessary to perform filling or excavation to accomplish the work shown in the plans and to those areas which must be entered to construct temporary or permanent structures. As soon as conditions permit, promptly clear rivers, streams, and impoundments of all obstructions placed therein or caused by construction operations.

C. Do not frequently ford live streams with construction equipment. Wherever an appreciable number of stream crossings are necessary at any one location, use a temporary bridge or other structure.

D. Except as necessary for construction, do not deposit excavated material in rivers, streams, lakes, canals, or impoundments, or in a position close enough thereto, to be washed away by high water or runoff.

E. Where pumps are used to remove highly turbid waters from enclosed construction areas such as cofferdams or forms, treat the water by one or more of the following methods prior to discharge into State waters: pumping into grassed swales or appropriate vegetated areas or sediment basins, or confined by an appropriate enclosure such as turbidity barriers when other methods are not considered appropriate.

F. Do not disturb lands or waters outside the limits of construction as staked, except as authorized by the authorities having jurisdiction.

1.5 SUBMITTALS, PLANS, AND PERMITS

A. The contractor shall apply for and obtain a National Pollutant Discharge Elimination System (NPDES) Permit or approval by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR Part 122.26.

B. The Contractor shall prepare the Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will include this erosion control plan and all additional measures that will be employed to dispose of, control, or prevent the discharge of solid, hazardous, and sanitary wastes to waters of the U.S. Include procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-storm water discharges, such as contaminated groundwater or accidental spills. The Owner will review the Contractor's SWPPP, including required signed certification statements, before soil disturbing activities begin.

C. Failure to sign any required documents or certification statements will be considered a default of the Contract. Any earth disturbing activities performed without the required signed documents or certification statements may be considered a violation of the Clean Water Act by the EPA.

D. Prepare the erosion control plan in accordance with the sequence of operations and present in the NPDES Storm Water Pollution Prevention Plan required format provided by State of Florida Department of Environmental Protection. The erosion control plan shall describe, but not be limited to, the following items or activities:
   1. For each phase of construction operations or activities, supply the following information:
      a. Locations of all erosion control devices
      b. Types of all erosion control devices
      c. Estimated time erosion control devices will be in operation
      d. Monitoring schedules for maintenance of erosion control devices
      e. Methods of maintaining erosion control devices
      f. Containment or removal methods for pollutants or hazardous wastes
   2. The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.
   3. Submit for approval the erosion control plans meeting standards listed below:
      a. Projects permitted by the South Florida Water Management District require the following:
         1) Obtain SFWMD's approval of the erosion control plan.
         2) Do not begin construction activities until the erosion control plan receives written approval from SFWMD.

1.6 PROJECT CONDITIONS

A. Temporary Erosion Control Facilities: Installer of temporary erosion control facilities shall assume responsibility for operation, maintenance, and proper function of each facility during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 – PRODUCTS

2.1 MATERIALS

A. The Owner will not require testing of materials used in construction of temporary erosion control features other than as provided for geo-textile fabric in FDOT 985-3 unless such material is to be incorporated into the completed project. When no testing is required, the Owner will base acceptance on visual inspection.

B. The Contractor may use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project, subject to the approval of the Owner.

C. Environmental Protection: Provide Best Management Practices environmental protection equipment to prevent air, soil, and water pollution in and around the project site. BMP's shall comply with contract specifications, FDEP regulations and FDOT standards. Contractor shall be solely liable and responsible for any fines issued by the regulatory agencies due to non-compliance or inadequate compliance. BMP's shall be maintained for the construction duration.

PART 3 – EXECUTION

3.1 PRECONSTRUCTION CONFERENCE

A. At the Pre-construction conference, provide to the Owner a special plan to prevent, control, and reduce erosion and water pollution, meeting the requirements or special conditions of all permits authorizing project construction. If no permits are required or the approved permits do not contain special conditions or specifically address erosion and water pollution, the project erosion control plan will be governed by this section.

3.2 CONSTRUCTION REQUIREMENTS

A. Limitation of Exposure of Erodible Earth:
   1. The Owner may limit the surface areas of unprotected erodible earth exposed by the construction operation and may direct the Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments or to prevent detrimental effects on property outside the project right-of-way or damage to the project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

B. Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 ft2 [70,000 m2] without specific prior approval by the Owner. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.

C. Incorporation of Erosion Control Features:

   1. Incorporate permanent erosion control features into the project at the earliest practical time. Use approved temporary erosion control features to correct conditions that develop during construction which were not foreseen at the time of design, to control erosion prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion that develops during normal construction operations, which are not associated with permanent erosion control features on the project.

D. Scheduling of Successive Operations:
   1. Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.

2. Schedule and perform clearing and grubbing so that grading operations can follow immediately thereafter. Schedule and perform grading operations so that permanent erosion control features can follow immediately thereafter if conditions on the project permit.

E. Details for Temporary Erosion Control Features:

1. General: Use temporary erosion and water pollution control features that consist of, but are not limited to, temporary grassing, temporary sodding, temporary mulching, sandbagging, slope drains, sediment basins, sediment checks, berms, baled hay or straw, floating turbidity barrier, staked turbidity barrier and silt fence. For design details for some of these items, refer to the Water Quality Section of the FDOT Design Standards.
2. Temporary Grassing: The Contractor may designate certain areas of grassing constructed in accordance with the SWPPP as temporary erosion control features. Keep the grass in a moist condition in order to ensure growth. The contractor will pay for all required watering and mowing.
3. Temporary Sod: Furnish and place sod in accordance within areas designated by the SWPPP to temporarily control erosion. Keep the sod in a moist condition in order to ensure growth. The contractor will pay for all required watering and mowing.
4. Temporary Mulching: Furnish and apply a 2 to 4 inch [50 to 100 mm] thick blanket of straw or hay mulch to designated areas, then mix or force the mulch into the top 2 inches [50 mm] of the soil in order to temporarily control erosion. Use only undecayed straw or hay which can readily be cut into the soil and which otherwise complies with FDOT 981-3. The Contractor may substitute other measures for temporary erosion control, such as hydromulching, chemical adhesive soil stabilizers, etc., for mulching with straw or hay, if approved by the Owner. When beginning permanent grassing operations, plow under temporary mulch materials in conjunction with preparation of the ground.
5. Sandbagging: Furnish and place sandbags in configurations to control erosion and siltation.
6. Slope Drains: Construct slope drains in accordance with the details shown in the plans, the FDOT Design Standards, or as may be approved as suitable to adequately perform the intended function.
7. Sediment Basins: Construct sediment basins in accordance with the details shown in the plans, the FDOT Design Standards, or as may be approved as suitable to adequately perform the intended function. Clean out sediment basins as necessary in accordance with the plans or as directed.
8. Berms: Construct temporary earth berms to divert the flow of water from an erodible surface.
9. Baled Hay or Straw:
    a. Provide bales having minimum dimensions of 14 by 18 by 36 inches [350 by 450 by 900 mm], at the time of placement. Construct baled hay or straw dams to protect against downstream accumulations of silt. Construct the baled hay or straw dams in accordance with the details shown in the plans or the FDOT Design Standards. Meet the provisions of FDOT 981-3.1 for all baled hay or straw.
    b. Place the dam to effectively control silt dispersion under conditions present on this project. The Contractor may use alternate solutions and usage of materials if approved.
10. Temporary Silt Fences:
    a. General: Furnish, install, maintain, and remove temporary silt fences, in accordance with the manufacturer's directions, these Specifications, the details as shown on the plans, and the FDOT Design Standards.
    b. Materials and Installation: Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of Section 985 according to those applications for erosion control.
    c. Choose the type and size of posts, wire mesh reinforcement (if required), and method of installation. Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective temporary silt fence that controls sediment comparable to the FDOT Design Standards, Index No. 102.
    d. Install all sediment control devices in a timely manner to ensure the control of sediment and the protection of lakes, streams, gulf or ocean waters, or any wetlands associated therewith and to any adjacent property outside the right-of-way as required.

e. At sites where exposure to such sensitive areas is prevalent, complete the installation of any sediment control device prior to the commencement of any earthwork.
f. After installation of sediment control devices, repair portions of any devices damaged at no expense to the Owner.
g. Erect temporary silt fence at upland locations across ditchlines and at temporary locations shown on the plans or approved by the Owner where continuous construction activities change the natural contour and drainage runoff. Do not attach temporary silt fence to existing trees unless approved by the Owner.
h. Inspect all temporary silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed by the Owner.
i. Remove sediment deposits when the deposit reaches approximately 1/2 of the volume capacity of the temporary silt fence or as directed by the Owner. Dress any sediment deposits remaining in place after the temporary silt fence is no longer required to conform with the finished grade.

11. Floating Turbidity Barriers and Staked Turbidity Barriers:
a. Install, maintain, and remove turbidity barriers to contain turbidity that may occur as the result of dredging, filling, or other construction activities which may cause turbidity to occur in the waters of the State. The Contractor may need to deploy turbidity barriers around isolated areas of concern such as seagrass beds, coral communities, etc. both within as well as outside the project limits. The Owner will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Install the barriers in accordance with the details shown in the plans or as approved by the Owner. Ensure that the type barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the construction site.
b. Operate turbidity barriers in such a manner to avoid or minimize the degradation of the water quality of the surrounding waters.

12. Rock Bags: Furnish and place rock bags to control erosion and siltation. Place the bags as shown in the plans, the FDOT Design Standards or as directed by the Owner. Use a fabric material with openings that are clearly visible to minimize clogging yet small enough to prevent rock loss. Use material of sufficient strength to allow removing and relocating bags without breakage. The bag size when filled with rocks shall be approximately 12 by 12 by 4 inch [300 by 300 by 100 mm]. Use No. 4 or No. 5 coarse aggregate rock.
13. Watering: Provide temporary water during earthwork operation to minimize airborne sediment pollution.

3.3 MAINTENANCE OF EROSION CONTROL FEATURES.

A. Provide routine maintenance of permanent and temporary erosion control features, at no expense to the Owner, until the project is complete and accepted. If reconstruction of such erosion control features is necessary due to the Contractor’s negligence or carelessness or, in the case of temporary erosion control features, failure by the Contractor to install permanent erosion control features as scheduled, the Contractor shall replace such erosion control features at no expense to the Owner.

B. Inspect all erosion control features at least once every seven calendar days and within 24 hours of the end of a storm of 0.25 inches [6 mm] or greater. Maintain all erosion control features as required in the Storm Water Pollution Prevention Plan and as specified in State and/or Federal environmental regulatory permits. Use an inspection form to report all inspection findings and to document all corrective actions taken as a result of the inspection. Sign each inspection report and submit with final closeout document package.

C. Mow of areas within the limits of the project. Mow these areas within every twenty-one days or more frequently. Do not mow slopes that are steeper than three horizontal to one vertical.

3.4 PROTECTION DURING SUSPENSION OF CONTRACT TIME

A. If it is necessary to suspend the construction operations for any appreciable length of time, shape the top of the earthwork in such a manner to permit runoff of rainwater, and construct earth berms along the top edges of embankments to intercept runoff water. Provide temporary slope drains to carry runoff from cuts and embankments that are in the vicinity of rivers, streams, canals, lakes, and impoundments. Locate slope drains at intervals of approximately 500 feet [150 m], and stabilize them by paving or by covering with waterproof materials. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation. The Owner may direct the Contractor to perform, during such suspensions of operations, any other erosion control work deemed necessary.

3.5 REMOVAL OF TEMPORARY EROSION CONTROL FEATURES

A. In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in an area of the project in such a manner that no detrimental effect will result. The Owner may direct that temporary features be left in place.

3.6 BASIS OF PAYMENT

A. Prices and payments will be full compensation for all work specified in this Section, including construction and routine maintenance of temporary erosion control features and for mowing. Any and all costs resulting from compliance with the requirements of this Section, including permitting, construction, routine maintenance, and removal of temporary erosion control features, watering and mowing, shall be included in the lump sum Contract within the general conditions of the contract.

B. Separate payment will not be made for the cost of erosion control features, including constructing temporary earth berms along the edges of the roadways to prevent erosion during grading and subsequent operations. The Contractor shall include these costs in the Contract prices for grading items.

C. In case of repeated failure on the part of the Contractor to control erosion, pollution, or siltation, the Owner reserves the right to employ outside assistance or to use the Owner’s own forces to provide the necessary corrective measures. Any such costs incurred, including design costs and fines, will be charged to the Contractor and appropriate deductions made from the monthly progress estimate.

END OF SECTION

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Protecting existing trees and shrubs to remain.
2. Removing existing trees, shrubs, groundcovers, plants, and, grass.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities.
7. Temporary erosion and sedimentation control measures.

B. Related Sections include the following:

1. Division 1 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities.
2. Division 1 Section "Construction Cleaning" for recycling requirements.
3. Division 1 Section "Execution and Hurricane Protection Requirements" for verifying utility locations and for recording field measurements.
4. Division 2 Section “Prevention, Control, And Abatement Of Erosion And Water Pollution” for temporary erosion and sedimentation control procedures.
5. Division 2 Section "Tree Protection and Trimming" for protecting trees remaining on-site that are affected by site operations.
6. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain; cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings, according to Division 1 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

E. Do not commence site clearing operations until all existing above and underground utilities in the path of site clearing operations have been located, marked, and capped or disconnected for safe operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Contractor shall be responsible for obtaining all necessary permits from all authorities having jurisdiction prior to commencing site clearing and tree removal.

B. Protect and maintain benchmarks and survey control points from disturbance during construction.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide 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. The Contractor shall be required to prepare and submit an NPDES permit application utilizing the Stormwater Pollution Prevention Plan.

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE REMOVAL AND TREE PRESERVATION

A. No trees shall be removed until approved by the City.

B. If trees are determined to remain, biobarrier shall be installed in accordance with the biobarrier detail as shown on the Construction Documents.

3.4 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.
2. Do not permit vehicles, equipment, or foot traffic within fenced area.
3. Maintain fenced area free of weeds and trash.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Owner.

1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.

2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Owner and authorities having jurisdiction.

3.5 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

C. Excavate for and remove underground utilities indicated to be removed.

D. Contractor is responsible for locating all existing utilities. Any utilities not located by the contractor and damaged during the construction shall be repaired or replaced to the owner's satisfaction solely at the contractor's own expense. No additional compensation shall be given to the contractor for repairing or replacing underground utilities damaged by the contractor or any sub-contractors.

3.6 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
4. Use only hand methods for grubbing within tree protection zone.
5. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.7 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within tree protection zones.
3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.8 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.9 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 02230

SECTION 02231 - TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

B. Related Sections include the following:

1. Division 1 Section "Summary" for limits placed on Contractor's use of the site.
2. Division 2 Section "Earthwork" for building and utility trench excavation, backfilling, compacting and grading requirements, and soil materials.

1.3 DEFINITIONS

A. Tree Protection Zone: Area surrounding individual trees or groups of trees to remain during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 SUBMITTALS

A. Tree Pruning Schedule: Written schedule from arborist detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

B. Qualification Data: For tree service firm and arborist.

C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

1.5 QUALITY ASSURANCE

A. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of tree protection and trimming.

B. Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and Other Woody Plant Maintenance--Standard Practices (Pruning)."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and toxic and other non-soil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.

B. Chain-Link Fence: Metallic-coated steel chain-link fence fabric of 0.120-inch- diameter wire; a minimum of 48 inches high; with 1.9-inch- diameter line posts; 2-3/8-inch- diameter terminal and corner posts; 1-5/8-inch- diameter top rail; and 0.177-inch- diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

C. Organic Mulch: Shredded hardwood, Ground or shredded bark, Wood and bark chips, free of deleterious materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Temporary Fencing: Install temporary fencing around tree protection zones to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete.

1. Install chain-link fence according to ASTM F 567 and manufacturer's written instructions.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Mulch areas inside tree protection zones and within drip line of trees to remain and other areas indicated.

1. Apply 3-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

D. Do not store construction materials, debris, or excavated material inside tree protection zones. Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems.

E. Maintain tree protection zones free of weeds and trash.

F. Do not allow fires within tree protection zones.

G. No trees shall be removed until approved by the City.

3.2 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

1. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction.
2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

D. Where utility trenches are required within tree protection zones, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.3 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond tree protection zones. Maintain existing grades within tree protection zones.

1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.

B. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.4 TREE PRUNING

A. Prune trees to remain that are affected by temporary and permanent construction.

B. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.

C. Pruning Standards: Prune trees according to ANSI A300 (Part 1) as follows:

1. Type of Pruning: Cleaning, Thinning, and Raising.
2. Specialty Pruning: Restoration, Vista, Palm, and Utility.

D. Cut branches with sharp pruning instruments; do not break or chop.

E. Chip removed tree branches and dispose of off-site.

3.5 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to arborist's written instructions.

B. Remove and replace trees indicated to remain that die or are damaged during construction operations that Architect and City or County inspector determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced; plant and maintain as specified.

C. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

D. Provide hand watering or irrigation system for replacement trees for a minimum of 6 months.

E. Warrant replacement trees for a minimum of 1 year. If the replacement tree dies, the warranty will restart from the planting or the replacement for minimum for 1 year for the second replacement tree.

3.6 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material and displaced trees from Owner's property.

END OF SECTION 02231

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subbase and base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling for utility trenches.
8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
9. Grading
10. Berms

B. Related Sections include the following:

1. Division 2 Section "Tree Protection and Trimming" for protecting and trimming trees to remain.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Geotechnical Engineer or Civil Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. Yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

B. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.5 QUALITY ASSURANCE

A. Contractor Qualification: The Sub-Contractor responsible for earthwork shall be an established company with a minimum of 10 years of experience and shall be certified by the Florida Department of Transportation for performing pavement operations on FDOT projects. Contractor must supply evidence of similar work having been performed on at least 10 other sites maintaining the degree of accuracy outlined in the grading specifications.

B. Field Contractor Qualifications: Sub-contractor in charge of field construction shall supply evidence of similar work having been performed on at least 10 other sites maintaining the degree of accuracy outlined in the grading specifications for field laser grading.

C. Field Grading Equipment: Specialized grading equipment shall be utilized to minimize compaction of prepared subgrade and topsoil. The grader shall be equipped with dual laser pickup, dual laser grade range mode, and the laser pickup shall operate the blade elevation controls automatically once they are locked on the laser beam. Each of the two laser pickups will operate only one end of the grader blade respectively. The laser source shall be capable of accuracy to three places of a percent (i.e., 1.234% of grade) and shall be capable of operating either the positive or negative angle of configuration without physically moving the laser source head.

D. Field Grading Operator Qualifications: Laser Grader operator shall supply evidence of similar work having been performed on at least 5 other sites maintaining the degree of accuracy outlined in the grading specifications for field laser grading.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.
3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrowed soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 or A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of [**washed] crushed** stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.2 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:

1. Portland Cement: ASTM C 150, Type I.
2. Fly Ash: ASTM C 618, Class C or F.
3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch nominal maximum aggregate size.
4. Foaming Agent: ASTM C 869.
5. Water: ASTM C 94/C 94M.
6. Air-Entraining Admixture: ASTM C 260.

B. Produce low-density, controlled low-strength material with the following physical properties:

1. As-Cast Unit Weight: 30 to 36 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
2. Compressive Strength: 140 psi, when tested according to ASTM C 495.

C. Produce conventional-weight, controlled low-strength material with 140-psi compressive strength when tested according to ASTM C 495.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 EXPLOSIVES

A. Explosives: Do not use explosives.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

    a. 24 inches outside of concrete forms other than at footings.
    b. 12 inches outside of concrete forms at footings.
    c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. 6 inches beneath bottom of concrete slabs on grade.
    f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Over Excavation: If over excavation is required in the foundation recommendations from the geotechnical engineer, the Contractor shall over excavate, backfill, and compact the soil below the foundations as recommended by the Geotechnical Engineer. See Soil Test Boring Report.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades. See section 02526 - Concrete Pavement Curb and Walkways for final slope requirements

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 SUBGRADE INSPECTION

A. Notify Geotechnical Engineer when excavations have reached required subgrade.

B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Civil Engineer, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by accumulated water or construction activities, as directed by Civil Engineer, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Clean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud or standing water.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud or standing water.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section "Cast-in-Place Concrete."

D. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

G. Place and compact final backfill of satisfactory soil to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 12 inch in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.15 GENERAL GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus **1 inch**.
2. Walks: Plus or minus **1/2 inch**.
3. Pavements: Plus or minus **1/2 inch**.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.16 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud or standing water.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Place base course material over subbase course under hot-mix asphalt pavement.
2. Shape subbase and base course to required crown elevations and cross-slope grades.
3. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
4. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

3.17 BERMS

A. Construct perimeter berms as per Civil Engineering Drawings, if shown. Berm slopes shall not exceed 6:1 gradient in from the crown to the toe.

B. Finish grades for all berms shall be certified by a registered surveyor at intervals no less than 100 feet o.c. shown on the final as-built survey.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02361 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Soil treatment with termiticide.
2. Wood treatment with borate.

1.3 PERFORMANCE REQUIREMENTS

A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

1.4 SUBMITTALS

A. Product Data: For termiticide, borate.

1. Include the EPA-Registered Label for termiticide and borate products.

B. Product Certificates: For termite control products, signed by product manufacturer.

C. Qualification Data: For Installer of termite control products.

D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Brand name and manufacturer of termiticide.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes, and rates of application used.
6. Areas of application.
7. Water source for application.

E. Wood Treatment Application Report: After application of borate is completed, submit report for Owner's record information, including the following:

1. Date and time of application.
2. Brand name and manufacturer of borate.
3. Quantity of undiluted borate used.
4. Dilutions, methods, volumes, and rates of application used.

5. Areas of application.

F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

C. Source Limitations: Obtain termite control products through one source.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

1.7 COORDINATION

A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

B. Apply borate treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.
2. Warranty shall include initial treatment, full coverage, and retreatment for five years for all native and non-native termites, including Formosan subterranean termites and Asian subterranean termites.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Termiticides:
   a. BASF; Termidor.
2. Borates:
   a. U.S. Borax Inc.; Tim-Bor.

2.2 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

2.3 WOOD TREATMENT

A. Borate: Provide an EPA-registered borate complying with requirements of authorities having jurisdiction, in an aqueous solution for spray application and a gel solution for pressure injection, formulated to prevent termite infestation in wood. Provide quantity required for application at the label volume and rate for the maximum diffusible borate concentration allowed for each specific use, according to product's EPA-Registered Label.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.

1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
3. Masonry: Treat voids.
4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.5 APPLYING BORATE TREATMENT

A. Application: Mix wood treatment borate solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of borate, according to manufacturer's EPA-Registered Label, so that wood framing, sheathing, siding, and structural members subject to infestation receive treatment.

1. Framing and Sheathing: Apply borate solution by spray to bare wood for complete coverage.
2. Wood Members Thicker Than 4 Inches: Inject borate gel solution under pressure into holes of size and spacing required by manufacturer for treatment.
3. Exterior Uncoated Wood Trim and Siding: Apply borate solution to bare wood siding. After 48 hours, apply a seal coat of paint as specified in Division 9 painting Sections.

END OF SECTION 02361

SECTION 02500 – ASPHALT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work of this section includes, but is not limited to:
   1. Temporary Paving
   2. Permanent Paving
   3. Pavement Marking and Striping

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Division 2 Section "Earthwork" for aggregate sub-base and base courses.
   3. Division 2 Section "Concrete Pavement Curb and Walkways"

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition, including Supplements.

B. Certification
   1. The Sub-Contractor responsible for paving shall be an established company with a minimum of 10 years of experience in paving and shall be certified by the Florida Department of Transportation for performing pavement operations on FDOT projects.

C. Rock and Final As-builts
   1. The Contractor responsible for paving shall submit as-builts for the sub-base and base course material prior to paving. The as-builts shall contain elevations showing the relationship of the engineer's design elevation to that of the constructed base courses. As-builts shall be prepared by a Professional Land Surveyor and shall be signed and sealed. The number of copies shall be determined. The accuracy of the prepared elevations shall be within 0.5 inch of the design grades. The Engineer has final approval of said as-builts and may required additional work be done to the base courses in order to more closely conform to the design plans. As-builts shall be submitted 10 days prior to the scheduled paving operation.

1.3 SUBMITTALS

A. Certificates:
   1. Submit certification from bituminous and aggregate suppliers attesting that materials conform to the Controlling Agency Specifications.
   2. Copy of sub-contractor's FDOT certification

B. Product Data:
   1. For each product specified, include technical data and tested physical and performance properties.

C. Material Certificates:
   1. Certificates signed by manufacturer certifying that each material complies with requirements.

1.4 JOB CONDITIONS

A. Control of Traffic:
   1. Take measures to control traffic during repaving operations. Do not allow traffic on repaved areas until authorized by the Engineer.

2. Employ traffic control measures necessary to maintain and to protect traffic, to protect the work in progress, to protect adjacent property from excess dust resulting from the construction area and to maintain traffic through, around, or adjacent to the construction area. The work shall include the furnishing and maintaining of all traffic control devices, flaggers, construction of temporary structures when required, labor, equipment and materials to keep the traveled road smooth and the furnishing and application of dust palliatives.

B. Restore existing paving outside the limits of the work that is damaged by the contractor's operations to its original condition at the expense of the Contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
B. Store pavement-marking materials in a clean, dry, protected location and within temperature range required by manufacturer. Protect stored materials from direct sunlight.

PART 2 - PRODUCTS

2.1 FLEXIBLE PAVEMENT MATERIALS, AGGREGATES, AND PAVEMENT MARKING PAINT

A. Bituminous Treatments, surface courses and concrete pavements shall conform to Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition. Thickness shall be a minimum of two (2) inches applied in two lifts. First lift to be 3/4" Type SP-12.5. Second lift to be 3/4" Type SP-12.5, unless otherwise noted on plans.
B. Refer to Florida Department of Transportation Standard Specifications, Latest Edition. All bituminous materials, aggregates, and pavement marking paint used in paving, resurfacing, and pavement marking and striping are designated in these specifications and shall conform to the applicable portions of the State specifications.

2.2 BITUMINOUS OVERLAY

A. Where indicated on the drawings, standard details, or directed by the engineer, place a bituminous overlay.
B. Thickness shall be a minimum of One (1) inch applied in one lift of Type S1 asphalt, unless otherwise noted on plans.

PART 3 - EXECUTION

3.1 TEMPORARY PAVING

A. Place temporary paving immediately upon completion of trench back-filling. Unpaved trenches shall not remain unpaved longer than one working day after back-filling.

B. Shape and compact subgrade material, then place and compact crushed stone base course to the required thickness.

C. Place temporary paving material. Compact to required minimum thickness with trench roller having minimum 300 pounds per inch-width of compaction roll.

D. Continuously maintain temporary paving to the satisfaction of the Engineer and the state and local road departments.

E. Remove and dispose of temporary pavement prior to the placement of permanent pavement.

3.2 PERMANENT PAVING

A. Excavate to the lines and grades on plans to receive permanent pavement, including the disposal of surplus excavated material. Remove all muck and organic materials.

B. Remove temporary paving material. Construct permanent base and surface courses to the required compacted thickness shown on the plans in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

C. Trim existing paving to remove damaged areas. Cut straight joint lines and right angle offsets.

D. Maintain permanent paving to the satisfaction of the Engineer and the local and state road departments throughout the contract maintenance period.

E. Utilize standard rolling procedure, comply with minimum equipment standards and coverage requirements as outlined in Florida Department of Transportation Standard Specifications for Road and Bridge Construction Section 330.

3.3 BITUMINOUS OVERLAY

A. Where indicated on the drawings, standard details, or directed by the engineer, place a bituminous overlay.
B. Construct in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

3.4 CONCRETE CURB AND SIDEWALK REPAIRS

A. Replace curbs and sidewalks damaged by construction to match existing.

B. Reconstruct curbs and sidewalks to the first expansion joint on either side of the damaged portion. Install preformed expansion joint material.

C. Sidewalks shall be new construction for the full width of the existing slabs.

D. Sidewalks and curbs materials and construction methods shall be in accordance with specification section 02526 and Sections 522 and 520 of the referenced Florida Department of Transportation Specifications.

3.5 PAVEMENT MARKING AND STRIPING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.

B. Allow paving to cure as directed by the Engineer before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

E. Contractor shall review plans to distinguish which striping shall be latex paint and which shall be thermoplastic.

END OF SECTION

SECTION 02511 – MAINTENANCE OF TRAFFIC

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work of this section includes, but is not limited to:
   1. Maintenance of Traffic in public right of ways and on construction site

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Division 2 Section “Earthwork” for aggregate sub-base and base courses.
   3. Division 2 Section “Concrete Pavement Curb and Walkways”
   4. Division 2 Section “Asphalt Paving“

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition, including Supplements.

B. Certification
   1. The Sub-Contractor responsible for maintenance of traffic shall be an established company with a minimum of 10 years of experience in paving and shall be certified by the Florida Department of Transportation for performing operations on FDOT projects.

1.3 SUBMITTALS

A. Certificates:
   1. Copy of sub-contractor’s FDOT certification

1.4 JOB CONDITIONS

A. Control of Traffic:
   1. Take measures to control traffic during repaving operations. Do not allow traffic on repaved areas until authorized by the Engineer.
   2. Employ traffic control measures necessary to maintain and to protect traffic, to protect the work in progress, to protect adjacent property from excess dust resulting from the construction area and to maintain traffic through, around, or adjacent to the construction area. The work shall include the furnishing and maintaining of all traffic control devices, flaggers, construction of temporary structures when required, labor, equipment and materials to keep the traveled road smooth and the furnishing and application of dust palliatives.

B. The Florida Department of Transportation “Standard Specifications for Road and Bridge Construction” dated 2019 together with “Supplemental Specifications to the 2019 Standard Specifications for Road and Bridge Construction” dated 2019 shall be used where applicable for the

various work, and that where such wording therein refers to the State of Florida and its Department of Transportation and personnel, such wording shall be replaced with the wording which would provide proper terminology; thereby making such "Standard Specifications for Road and Bridge construction" as the "Standard Specifications" for this project. If within a particular section, another section, article or paragraph is referred to, it shall be part of the standard specifications also. The Contractor/Construction Manager shall abide by all local and state laws, regulations and building codes which have jurisdiction in the area.

PART 2 - PRODUCTS

PART 3 – EXECUTION

3.1 MAINTENANCE OF TRAFFIC:

It shall be the sole responsibility of the Contractor/Construction Manager to install and maintain adequate traffic control devices, warning devices and barriers for the purpose of protecting the traveling public, his workmen and the work area in general. Such traffic control shall be maintained for the duration of the project period, including any temporary suspensions of the work. Maintenance of traffic shall be in the accordance with the section 102 of the "Standard Specifications" and the State of Florida, Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and utility operations. Where required by the agency having jurisdiction over the ROW, a "Maintenance of Traffic" plan shall be approved by that agency and a copy forwarded to the Project Consultant prior to beginning the associated work. All requirements of the jurisdictional agency are to be included in the Contractor's/Construction Manager's GMP and no extra payment will be made for Maintenance of Traffic.

END OF SECTION 02511

SECTION 02526 - CONCRETE PAVEMENT CURB AND WALKWAYS

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. Concrete pavement, curbs and sidewalk shall be constructed to the lines and grades and dimensions required for a complete installation as shown on the Drawings and specified herein.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition, including Supplements.
   2. American Society of Concrete Contractors - The Contractors Guide to Quality Concrete Construction, third edition
   3. American Concrete Institute - Field Reference Manual - ACI MNL-15(16) and Specifications for Structural Concrete ACI 301-20

B. Certification
   1. The Sub-Contractor responsible for concrete curbs and sidewalks shall be an established company with a minimum of 10 years of experience in installation of concrete curbs and sidewalks and shall be certified by the Florida Department of Transportation for performing concrete operations on FDOT projects.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockups for colored concrete sidewalks including accessories.
      a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring and base condition for each color and pattern in locations directed by Owner and Architect.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to colored concrete sidewalk including, but not limited to, the following:
      a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
      b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      c. Review special terrazzo designs and patterns.
      d. Review dust-control procedures.
      e. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.

1.3 SUBMITTALS

A. Shop drawings for reinforcing, joint material and mix designs shall be submitted for review in accordance with the section entitled "Submittals".

B. Copy of sub-Contractor’s FDOT certification.

C. Colored Concrete sidewalk color samples – min 12” x 12”.

PART 2 - PRODUCTS

2.1 CONCRETE

A. Concrete shall be conforming to the section entitled "Cast-in-place Concrete", unless noted or specified otherwise.

2.2 REINFORCING AND WELDED WIRE FABRIC

A. Joint reinforcing and welded wire fabric shall conform to the section entitled "Concrete Reinforcement'.

2.3 JOINT SEALER

A. Joint filler material in back of the sealants shall be a closed cell polyethylene conforming to the requirements specified hereinafter.

1. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

2. Joint Filler: Preformed Expansion Joint Filler or Slab Isolation Joint Filler with typical thickness 1/2, 3/4, or 1 inch and height equal to slab thickness with a removable top section for creation of a sealant void.
   a. Materials: Provide a semi-rigid, closed-cell polypropylene foam, preformed joint filler that fully complies with ASTM D8139. NOMAFLEX® by Nomaco, Inc.
   b. Manufacturers: Nomaco, Inc., 501 Innovative Way, Zebulon, NC 27597. Phone (877) 291-1157. Fax (919) 269-7936. Website: https://www.nomaco.com/product/nomaflex/

B. Traffic Rated Joints: (Subject to Vehicular or Pedestrian Traffic) Sealant at traffic joints shall be two-part Silicone-base sealant of self-leveling consistency, meeting the following standards:
   1. Products:
      a. Pecora Corporation; Pecora 322FC Fast Cure Traffic Rated Sealant.
      b. Or approved equal
   2. Weatherability - This sealant's 100% silicone composition is virtually unaffected by UV, Precipitation, ozone, and temperature extremes.
   3. Sealant shall remain flexible under extreme temperature swings (-49° to 300°F).
   4. Fast Curing - Fast cure profile allows quick job site turnaround. Early movement shall not affect sealant performance.
   5. Self-leveling - No tooling required when applied through typical static mixing equipment.
   6. Auto-bonding - Will bond to itself tenaciously without the need for priming.
   7. Minimum Performance as listed below:

ASTM D 412	EB, %	1400
ASTM D 412	TB	50
ASTM C 1135	25M, psi	5
	50M, psi	12
	150M, psi	15
ASTM C 1135	EB, %	>600
ASTM C 719	% Movement	+100/-50
ASTM D 2240	Shore 00	55

PART 3 - EXECUTION

3.1 SUBGRADE CONDITION

A. The finished subgrade shall be maintained in a smooth, compact condition and any areas which are disturbed prior to placing of the concrete shall be restored at the Contractor's expense. The subgrade shall be moist at the time the concrete is placed. Water shall be uniformly applied ahead of the paving operations as directed by the Engineer. If the Contractor does not maintain the subgrade in the required moist condition, a vapor barrier sheet will be required between the subgrade and the concrete.

B. The sub-grade shall be accurately trimmed to the required elevation with a 1/4-inch tolerance. High areas shall be trimmed to proper elevation. Low areas may be filled with suitable material and compacted to the specified density or filled with concrete integrally with the placing of the pavement.

3.2 SLOPES

A. Sidewalks shall not exceed 1:21 slope in the direction of travel and 1:51 cross slope. If multiple directions of travel exist, the maximum slope in all directions shall not exceed 1:51.

B. Sidewalk and ramp slopes shall be conformance with U.S. Department of Justice A.D.A. standards for accessible design, A.D.A. Accessibility guidelines, Florida Building Code-Accessibility and ADAAG.

C. Notification: Contractor shall examine the construction documents and site conditions thoroughly and notify the Architect and Civil Engineer if the site conditions do not allow construction of sidewalks in conformance with these specifications and in conformance with U.S. Department of Justice A.D.A. standards for accessible design, A.D.A. Accessibility guidelines, Florida Accessibility Code, 2020. Do not proceed with construction prior to receiving clarification. Proceeding without stated notification will result in the Contractor being fully responsible for removal and replacement of all non-conforming construction at his cost with no additional time or compensation consideration.

3.3 SETTING FORMS

A. The forms shall be accurately set to line and grade and such that they rest firmly, throughout their entire length upon the compacted subgrade surface. Forms shall be joined neatly and tightly and braces to test the pressure of the concrete and the finishing operations. The alignment and grade of all forms shall be approved before and immediately prior to the placing of concrete.

B. 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 that provide a continuous curve at specified radii. Forms shall be continuous for lengths not less than 12-feet, unless a change in direction is required. Do not use scraps and salvage material for formwork.

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

D. Chemical release agents shall be applied to inside surface of all forms. Apply release agents to concrete surface if existing concrete surface is to be used as a form.

3.4 MIXING CONCRETE

A. Concrete shall be mixed in accordance with the section entitled "Cast-in-place Concrete".

3.5 PLACING CONCRETE

A. The concrete shall be distributed on the subgrade to such depth, that, when it is consolidated and finished, the

slab thickness required by the Drawings will be obtained at all points and the surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the subgrade in a manner which will require as little rehandling as possible.

B. Fabric reinforcement shall be placed at mid slab depth, and the fabric shall be maintained at this location during the placing and finishing operations.

C. Concrete shall be thoroughly consolidated against and along the faces of all forms, by means of hand-operated, spud-type vibrators. Vibrators shall not be permitted to come in contact with the subgrade or a side form. Vibration at any one location shall not continue so long as to produce puddling or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

3.6 STRIKING-OFF, CONSOLIDATING AND FINISHING CONCRETE

A. Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface sequence of operations shall be as follows: strike-off; vibratory consolidation; screeding; floating; removal of laitance; straight edging; and final surface finish.

B. 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.

3.7 STRAIGHTEDGING AND SURFACE CORRECTIONS

A. After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10 foot straightedge. The straightedge shall be furnished by the Contractor. The straightedge shall be held in successive positions parallel to the road center line, in contact with the surface, and the whole area tested from one side of the slab to the other, as necessary. Any depressions shall be immediately filled with freshly mixed concrete and struck-off; consolidated and refinished. High areas shall be cut down and refinished. Straightedge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.

B. 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.

3.8 FINAL FINISH

A. As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes nonplastic, a light broom finish or other finish as called for in the plans, shall be given to the surface.

B. Apply fine finish by an approved hand method to curb cut ramps in lieu of broom finish.

3.9 EDGING

A. After the final finish has been applied, but before the concrete has become nonplastic, the edges of the pavement along each side of the strip being placed, on each side of construction joints and along any structure extending into the pavement, shall be carefully rounded to a 1/2-inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smoother, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.

B. All joints shall be checked with a straightedge before the concrete has become nonplastic and, if one side of the joint is higher then the other or the entire joint is higher or lower then the adjacent slabs, corrections shall be made as necessary.

3.10 JOINTS

A. Construction Joints
   1. Construction joints shall be located as shown on the Drawings.

B. Expansion Joints Around Structures and at 50' linear feet O.C.
   1. Expansion joints shall be formed by placing premolded expansion joint material about all structures and features projecting through, into or against the concrete. Unless otherwise indicated, such joints shall be 1/2 inch in width.
   2. All expansion joints shall receive two part Silicone base sealant.

C. Transverse Expansion Joints
   1. Open type transverse expansion joints shall be provided at all sidewalk returns and at 50 feet intervals and wherever indicated on the Drawings. Open type joints shall be formed by staking a 1/4 inch thick metal bulkhead in place and placing concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be opened and edged with a tool having a 1/4 inch radius. Transverse expansion joints shall be cleaned and filled with joint filler strips 1/4 inch thick conforming to the requirements of AASHTO M-1 53.
   2. All transverse expansion joints shall receive two part Silicone base sealant.

D. Scored Joints
   1. Scored joints shall be either formed or sawed at 5- foot intervals and shall extend to a depth of at least one fourth of the sidewalk slab thickness. Scored joints for slabs that are not sidewalks shall be as indicated in the plans. Absolute maximum distance between scored joints on slabs to be 12-feet. Joints shall be placed within 6 hours of concrete placement.

3.11 CURING

A. After the finishing operations have been completed and as soon as the concrete has hardened sufficiently that marring of the surface will not occur, the entire surface and the edges of the newly placed concrete shall be covered and cured with membrane curing compound.

B. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200-square feet, by a mechanical sprayer.

C. Curing compound shall not be applied during periods of rainfall. Curing compound shall not be applied to the inside faces of joints to be sealed. Should the film become damaged form any cause within the required curing period, the damaged portions shall be repaired immediately with additional compound. Upon removal of side forms the sides of the slabs exposes shall immediately be coated to provide a curing treatment equal to that provided for the surface.

3.12 CURB AND SIDEWALK CONSTRUCTION

A. The concrete curbs and sidewalks shall be constructed on a prepared smooth subgrade of uniform density. Large boulders and other obstructions shall be removed to a minimum depth of 6 inches below the finished subgrade elevation and the space shall be backfilled with sand, base course material or other suitable material which shall be thoroughly compacted by rolling or tamping. The Contractor shall furnish a template and shall thoroughly check the subgrade prior to depositing concrete.

B. Concrete for curbs, and sidewalks shall be formed, mixed, placed and finished in conformance with the requirements of other Sections of this Division 3, except as modified herein. Concrete shall be cured with a clear membrane curing compound which shall be applied at a uniform rate of one gallon per 200 square feet in accordance with the requirements specified herein before under pavement construction.

3.13 CURBS

A. Curbs shall be constructed in uniform sections ten feet in length except where shorter sections are necessary for closures or arcs. The sections shall be separated by sheet metal templates set perpendicular to the face and tip of the curve and not less than 2 inches longer than the depth of the curb. The templates shall be held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.

B. After the concrete has sufficiently set for a minimum of 12 hours, the Contractor shall remove the forms and backfill the spaces on each side. The earth shall be compacted in satisfactory manner with out damage to the concrete work. Minor defects shall be filled with a mortar composed of one part Portland cement and two parts fine aggregate.

C. All curbs and curb ramps shall be in accordance with the latest edition of Florida Department of Transportation Roadway and Traffic Design Standards.

3.14 DETECTABLE WARNING

A. At all places in the Right of Way, where a sidewalk or concrete ramp crosses or adjoins a vehicular drive, the Contractor shall provide a detectable warning. Extend full width of sidewalk / ramp and in the direction of travel 36" back from the curb. Detectable warnings shall be constructed by texturing a truncated dome pattern in conformance with U.S. Department of Justice A.D.A. standards for accessible design, A.D.A. Accessibility guidelines, Section 4.29.2. The detectable warning shall also comply with Florida Accessibility Code 2010 and ADAAG.

B. Detectable warnings shall be colored in contrast with the adjacent sidewalk / ramp (light on dark or dark on light).

3.15 FORM REMOVAL / REPAIR OF MINOR DEFECTS

A. 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. Plastering on the face of the curb or sidewalks will not be allowed.

B. Remove and replace any rejected sidewalk, curb, curb and gutter, or valley gutter without additional compensation.

3.16 REPAIR OF MAJOR DEFECTS

A. Sidewalks, curbs, curb and gutter, or valley gutter not in full conformance with these specifications, the reference standards, or applicable codes shall be removed and replaced without additional compensation or time extension. Reasons for rejection may include, but not limited to, failing to meet construction quality standards, tolerances, or specified appearance and finish.

END OF SECTION 02526

SECTION 02760 - PAVEMENT MARKING AND POST SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All applicable provisions of the Contract Requirements and Division 1 – General Requirements shall govern the work under this section.

1.2 WORK INCLUDED

A. This Section includes the following:

1. Pavement marking.
2. Protection of painted markings.
3. Aluminum or steel sign panels and posts.
4. Exterior signage indicated on the drawings and specified in this section.

1.3 SUBMITTALS

A. Submit properly identified manufactures product data and technical data prior to starting work for review and acceptance of all components to be used.

B. Submit shop drawings for review, indicating construction details, sizes, elevations, installation requirements, gages, thickness of materials, color and other information necessary to show compliance with the requirements of this section.

C. Submit paint tests, as specified in Section 971 of FDOT Specifications and as applicable to hereinafter specified material.

1.4 QUALITY ASSURANCE

A All signage must comply with the latest edition of the Florida Building Code and all referenced standards included therein as well as all other applicable code ordinances.

B. Work shall be performed in accordance with the Contract Documents in a neat and accurate manner.

C. All equipment shall be of type and design that will readily obtain the required uniformity of application of the pavement markings both as to thickness of coating and as to alignment.

D. Applicable Publications: The following publications of the issue listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

1. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction. (Latest Edition)
2. Manual on Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation, Federal Highway Administration, (Latest Edition)

PART 2 – PRODUCTS

2.1 MATERIALS

A. Paint: In accord with requirements as specified in Section 971 of the FDOT Specifications.

1. Paint shall be factory mixed, quick drying and non-bleeding type.
2. Color shall be as per D.O.T. requirements.

3. Striping, arrows, lane markers and stop bars shall be provided with paint containing reflective additive.

B. Thermoplastic paint: In accord with the applicable Technical Specifications (Section 711) of the Florida Department of Transportation and Broward County Standards.

C. Reflectors: In accord with Broward County Minimum Standards.

D. Sign Panels:
1. Aluminum or galvanized steel in accordance with the applicable requirements of Section 700 "Highway Signing" of the FDOT Standard Specifications or Broward County Administrative Code “Minimum Standards”
2. Size, shape and color as indicated on the drawings or as directed by City.

E. Sign Support Posts:
1. Aluminum or Galvanized Steel in accordance with the applicable requirements of Section 700 "Highway Signing" of the FDOT Specifications or Standard Road Details and Specifications (DCPWD).
2. Size, shape and color of posts and mountings as indicated on drawings or as directed by City.

PART 3 – EXECUTION

3.1 INSPECTION

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

3.2 SIGN PANELS AND SUPPORT INSTALLATION

A. Secure breakaway sign post assembly to concrete substrate and sign panel to aluminum posts according to FDOT and Broward County recommendations
1. Section 700 "Highway Signing" of FDOT Specifications
2. Manual on Uniform Traffic Control Devices
3. Broward County Administrative Code “Minimum Standards”

B. Approved shop drawings and as indicated on drawings

3.3 PAVEMENT MARKINGS

A. Sweep dust and loose material from the sealed surface.

B. Apply paint striping as indicated on the drawings, with suitable mechanical equipment to produce uniform straight edges.
1. Apply in not less than (2) two coats as per manufacturer's recommended rates of applications.

C. Protect pavement markings until completely dry in accordance with manufacturer’s recommendations.

D. Time of Application: Painting shall be done only during daylight hours and, as far as practical, shall be terminated in time to permit sufficient drying by sunset.

E. Weather Limitations: No paint shall be applied when any moisture is present on the surface to be painted or when the air temperature is below 40 degrees F. Painting shall not be done when winds are sufficient to cause spray dust.

F. Preparation of Surface to be Painted: The surface which is to be painted shall be cleaned, by compressed air or other effective means, immediately before the start of painting and shall be clean and dry when the paint is applied. Any vegetation or loose soil shall be removed from the pavement

before striping is begun.

G. Mixing Paint: The paint shall be thoroughly mixed before it is poured into the painting machine and no thinning of the paint in the machine will be allowed at any time. Before the start of each day's work the paint container, the connections and the spray nozzles on the machine shall be thoroughly cleaned with paint thinner or other suitable cleaner.

H. Paint Application: The traffic markings shall be of the specified dimensions with clean, true edges and without sharp breaks in the alignment. A uniform coating of paint shall be obtained and the finished markings shall contain no light spots or paint skips. Any stripes that do not have a uniform, satisfactory appearance, both day and night, shall be corrected.

I. Rate of Paint Application: The minimum rate of application for paint shall be as follows:
   1. Six inch solid parking stall stripes: 18.5 gallons per mile.
   2. Any other width stripe or marking: A direct proportion of the above.

J. Required Film Thickness: The minimum wet film thickness for all painted areas shall be 15 mils.

K. Alignment of Stripes: Where a stripe deviates from the correct alignment, as indicated by the string line, by more than one inch in any 20 foot length, it shall be obliterated and the stripe corrected hereinafter as specified in paragraph "Corrective Measures".

3.4 PROTECTION OF PAINTED MARKINGS

A. Protection of Stripes: All newly painted stripes, or other markings, shall be protected until the paint is sufficiently dry to permit vehicles to cross the marking without damage from the tires.

B. Repair of Damaged Areas: Any portions of the stripes damaged by passing traffic or from any other cause shall be repainted.

3.5 DIMENSION AND ALIGNMENT TOLERANCE

A. Dimensions: No marking shall be less than the specified width. No markings shall exceed the specified width by more than 1/2 inch. Alignment tolerances shall be as specified herein.

B. Correction Rates: Any corrections of variation in the width of the alignment of stripes shall not be made abruptly but the stripes shall be returned to the design width at the rate of at least 10 feet for each 1/2 inch of correction.

3.6 CORRECTIVE MEASURES:

A. All painted markings which fail to meet the specifications, including the permissible tolerances and the appearance requirements, or are marred or damaged shall be corrected.
   1. All drip and spattered paint shall be removed. When it is necessary to remove paint, it shall be done by means that will not damage the underlying surface of the pavement. When necessary to correct a deviation that exceeds the permissible tolerance in alignment, that portion of the stripe affected shall be removed and repainted in accordance with these specifications.

B. Corrective Devices: Misalignment, defective surfaces, etc., shall be corrected by chemical agents, or by any other type of mechanical device which will effectively remove the paint without damage to the pavement surface, or prevent the reapplication of markings.

END OF SECTION

SECTION 02780 - UNIT PAVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Concrete pavers set in aggregate setting beds.
2. Aluminum edge restraints.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for excavation and compacted subgrade.
2. Division 7 Section "Joint Sealers" for sealing control and expansion joints in unit pavers with elastomeric sealants.

1.3 SUBMITTALS

A. Product Data: For materials other than water and aggregates.

B. Product Data: For the following:

1. Pavers.
2. Mortar and grout materials.
3. Edge restraints.

C. Samples for Initial Selection: For the following:

1. Each type of unit paver indicated.
2. Joint materials involving color selection.
3. Exposed edge restraints involving color selection.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.

D. Store liquids in tightly closed containers protected from freezing.

1.6 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout:

1. Cold-Weather Requirements: Protect unit paver work against freezing when ambient temperature is 40 deg F and falling. Heat materials to provide mortar and grout temperatures between 40 and 120 deg F. Provide the following protection for completed portions of work for 24 hours after installation when the mean daily air temperature is as indicated: below, cover with weather-resistant membrane; below 25 deg F, cover with insulating blankets; below 20 deg F, provide enclosure and temporary heat to maintain temperature above 32 deg F.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936, made from normal-weight aggregates.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Wausau Tile Estate – As Basis of Design
2. Thickness: 3” for traffic bearing.
3. Face Size and Shape: – 6” x 12”. See detail on drawings for installation and selections.
4. Color: Estate HRT-15, HRT-34, HRT-38. Submit samples for final selection.
5. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Wausau Tile, Inc.
      9001 US-51 BUS, Rothschild, WI 54474
      Phone: (715) 359-3121
   b. OR Approved Equal

B. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936, made from normal-weight aggregates.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. Belgard Moduline Series – As Basis of Design -To match with Civic Center Vehicular Drop-Off Area
   2. Thickness: 4” for traffic bearing.
   3. Face Size and Shape: – 6” x 12”. See detail on drawings for installation and selections.
   4. Color: Field & Border. Submit samples for final selection.
   5. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. Belgard Pavers & Hardscapes Manufacturer
      b. OR Approved Equal

2.2 ACCESSORIES

A. Aluminum Edge Restraints: L-shaped, 3/16-inch- thick by 2-1/4-inch- high extruded-aluminum edging with loops pressed from face to receive stakes at 12 inches o.c., and aluminum stakes 12 inches long for each loop.

   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

      a. Sure-Loc Edging Corporation.

B. Cork Joint Filler: Preformed strips complying with ASTM D 1752, Type II.

C. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

2.3 AGGREGATE SETTING-BED MATERIALS

A. Graded Aggregate for Subbase: Sound, crushed stone or gravel complying with ASTM D 2940, subbase material requirements in Division 2 Section "Earthwork" for subbase material.

B. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.

C. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

   1. Provide sand of color needed to produce required joint color.

D. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications; made from polyolefins or polyesters, with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

   1. Survivability: Class 2; AASHTO M 288.
   2. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
   3. Permittivity: 0.02 per second, minimum; ASTM D 4491.
   4. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

E. Herbicide: Commercial chemical for weed control, registered with the EPA. Provide in granular, liquid, or wettable powder form.

2.4 GROUT MATERIALS – STAIRS ONLY

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement, unfading mineral pigments and white or colored sand as required to produce required color.

1. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed sand-portland cement grout.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering latex additives that may be incorporated into the Work include, but are not limited to, the following:

1) Bonsal, W. R. Company.
2) Laticrete International, Inc.
3) MAPEI Corp.

B. Grout Colors: As selected by Architect from manufacturer's full range.

C. Job-Mixed, Polymer-Modified Portland Cement Grout: Add liquid-latex additive to portland cement and sand in proportion and concentration recommended by liquid-latex manufacturer. Proportion cement and sand to comply with written instructions of latex-additive manufacturer.

1. Pigmented Grout: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ratio of 1:10, by weight.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean concrete substrates to remove dirt, dust, debris, and loose particles.

B. Proof-roll prepared subgrade according to requirements in Division 2 Section "Earthwork" to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive subbase and base course for unit pavers.

3.3 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.

B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

D. Joint Pattern: Basket weave with random application of 3 colors.

E. Tolerances: Do not exceed 1/32-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet from level, or indicated slope, for finished surface of paving.

F. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide foam filler as backing for sealant-filled joints. Install joint filler before setting pavers. Sealant materials and installation are specified in Division 7 Section "Joint Sealants."

G. Expansion and Control Joints: Provide joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.

H. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

1. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.
2. For metal edge restraints with top edge exposed, drive stakes at least 1 inch below top edge.
3. Where pavers embedded in concrete are indicated as edge restraints for pavers set in aggregate setting bed, install pavers embedded in concrete and allow concrete to cure before placing aggregate setting bed and remainder of pavers. Hold top of concrete below aggregate setting bed.

I. Provide steps made of pavers as indicated. Install paver steps before installing adjacent pavers.

3.4 AGGREGATE SETTING-BED APPLICATIONS

A. Compact soil subgrade uniformly to at least 95 percent of ASTM D 1557 laboratory density.

B. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Place separation geotextile over prepared subgrade, overlapping ends at least 24 inches and edges at least 12 inches.

D. Place aggregate base, compact to 100 percent of ASTM D 1557 maximum laboratory density, and screed to depth indicated.

E. Place leveling course and screed to a thickness of 1 to 1-1/2 inches, taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

F. Treat leveling course with herbicide to inhibit growth of grass and weeds.

G. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch with pieces cut to fit from full-size unit pavers.

1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.

H. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:

1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
2. Before ending each day's work, fully compact installed concrete pavers to within 36 inches of the laying face. Cover pavers that have not been compacted, and leveling course on which pavers have not been placed, with nonstaining plastic sheets to protect them from rain.

I. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.

J. Do not allow traffic on installed pavers until sand has been vibrated into joints.

K. Repeat joint-filling process 30 days later.

3.5 REPAIRING, POINTING, AND CLEANING

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.

END OF SECTION 02780

SECTION 02788 – SYNTHETIC TURF SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this contract, including general and supplementary conditions and other division 1 specification sections apply to this section.

1.2 WORK INCLUDED

A. Playground Grass resilient surface systems for surfaces under and around playground equipment including but not limited to the furnishing and installing an artificial grass safety surface over a compacted base. The finished product shall be seamed to provide a resilient, continuous surface over the entirety of the project surface.

B. Work includes all labor, materials, tools, equipment, and applicable taxes to perform all work and services for the installation of the surface.

1.3 REFERENCE SPECIFICATIONS AND STANDARDS

A. Materials and methods of construction shall comply with the latest provisions of the following standards:
   1. ASTM F 1292-22 “Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment”.
   2. ASTM D2859 “Flammability Standard”.
   3. ASTM F1951-21: “Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.”
   4. ASTM D7968: Standard Test Method for Determination of Polyfluorinated (PFAS) Compounds in Soil by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)

1.4 SUBMITTAL

No alternate product must be submitted with prior approval packages a minimum of ten (10) days prior to bid date. Submittal packages shall include but not be limited to:

A. Laboratory Test Reports: Materials certificates certifying each material item complies with, or exceeds, specified requirements. Certificates of compliance must be signed by materials producer and contractor.

A. Product Verification: Delivery slip for each material shipment, including turf and infill material.

B. Warranties: Product and maintenance warranties must be provided to owner prior to installation.

C. Field test inspection reports and samples for material including impact attenuation, permeability, and flammability.

D. Playground Grass Surface Installer Qualifications: A list of ten (10) playground surfacing projects completed with a similar product within the last five (5) years. List shall include names of project representatives and respective telephone numbers. This list shall also contain projects which require the same level of difficulty: e.g. number of poles and cutouts, transitions, and other special requirements.

These ten (10) projects shall have been contracted and installed by the company bidding the job.

E. Product Substitution Submittals: Contractor shall provide the following material for Playground Grass material substitution.
   1. At least one project more than 5,000 square feet and completed in two (2) years.
   2. Two 1'x1' product samples.
   3. Product warranty and guarantee from manufacture warranting against all defects for a 15 year period.
   4. A written guarantee from manufacturer for workmanship.
   5. Impact attenuation (per fall height requirements), permeability, and flammability test results from independently approved and certified testing laboratories.
   6. The artificial grass installer/contractor will provide a maintenance procedure for the installed surface.

1.5 TESTING OF MATERIALS

A. The following are test results from an independent testing laboratory which must also be submitted:
   1. Impact Attenuation: ASTM 1292-04: Impact attenuation test results will be provided. These test results shall be certified and submitted on the letterhead of an independent testing lab. Impact attenuation test results shall meet or exceed Consumer Product Safety Commission Guidelines for impact attenuation (G-max and Head Injury Criterion "H.I.C."). Test results must be administered and evaluated under the same test and these results must be shown for three dropsat each required temperature: 32o, 72o, 120o; yield less than 200 G's and less than 1,000 H.I.C. Only test results from ASTM testing approved laboratories, F8 committee will be acceptable. Approved testing laboratories are TSI and Detroit Testing.
   2. Permeability: Product shall meet or exceed a coefficient of permeability of 31" per hour.
      NOTE: From a geotechnical standpoint, the permeability of a material is a measure of the velocity at which water will flow through the void spaces or pores under a given hydraulic gradient. The product shall handle a minimum of 20" of rainfall per hour.
   3. Flammability (PILL test)
      NOTE: To assure compliance with a, b, and c installation shall be provided by an approved installer, who has at least five successful installs.
   4. PFAS Within Specified Limits: ASTM D7968: Standard Test Method for Determination of Polyfluorinated (PFAS) Compounds in Soil by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)

1.6 WORKMANSHIP AND QUALITY ASSURANCE

A. The artificial grass is to be installed per manufacturer's specifications.

B. All artificial grass and components shall be provided by a single source.

1.7 DELIVERY AND STORAGE OF MATERIALS

A. Artificial grass will be delivered in rolls 15' wide and wrapped in plastic. SafetyFoam Pro™ will be delivered on pallets in a separate shipment.

B. Products will be stored out of sight (as much as possible) and secured the same to prevent tampering.

1.8 GUARANTEE/WARRANTY OF THE MATERIAL AND WORKMANSHIP

A. The artificial grass installed under this contract will be warranted for a period of fifteen (15) years for materials and covers the surface for wear, through deterioration and excessive fading/UV degradation. Vandalism and force majeure will not be covered. A written warranty must be submitted by the installer.

B. When defective material or workmanship is discovered which will require repair or replacement, all such repair work or replacement work shall be done by the contractor at its own expense after written notification is given of such required repairs. However, if the contractor fails to comply with the requirements of the above guarantee within a reasonable time after notification is given, the repairs will be made by others at the contractor's expense.
   1. Any unsafe conditions that arise shall be secured and maintained by the installer until all required repairs or replacements have been completed.
   2. All resurfacing will conform in kind and quality to the specifications set forth in the plans and specifications and will be free of defects in workmanship and material.

PART 2 - PRODUCTS

2.1 DESCRIPTION OF SYSTEM

Resilient safety surface shall be Playground Grass Academy as manufactured by ForeverLawn Inc. Resilient safety surface shall have all of the following requirements independently and collectively:

A. Blades: Primary blades to be field green and secondary blades to be a turf green/tan blend. The primary blades will be 100% polyethylene slit-film. Polyethylene blades will be slit film straight and curled. The secondary blades to be heat set texturized nylon monofilament. Tufting construction requires dual primaries in the same row.

B. Weight: The product face weight will be 48 ounces. With backing, the total weight of the product will be 103 ounces.

C. Tufting: The tufting gauge will be 3/8", pile height 1 3/4".

D. Backing: The backing shall be a multi-layered, three part:
   1. First single layer (stabilized primary consisting of polyester, fiberglass, and polyurethane. It is 18 pic construction and 6 ounces.
   2. Second layer is a minimum of 40 ounce urethane layer.
   3. Third layer is nonwoven, recycled, geotextile fleece.

E. Seams: Primary seaming system shall be a micromechanical seam, utilizing hook and loop technology.

F. Resilient subsurface padding: SafetyFoam Pro which is a closed cell expanded polypropylene panel.
   1. Padding thickness shall be minimum 2" throughout, but not less than the fall height for each specified playground equipment.

G. Infill: Sand - 3.75 - 4 lbs. of 12/20 silica sand, Envirofill®, or T°Cool® per square foot.

PART 3 - EXECUTION

3.1 BASE REQUIREMENTS

A. The base shall be angular stone, leveled, and compacted at a depth of 3" to 4"

3.2 PREPARATION

A. The perimeter of the area shall be defined with a composite nailer board, unless an acceptable surface for anchoring the turf currently exists. These nailer boards will be secured into concrete or blacktop, or held in place with rebar spikes.

3.3 INSTALLATION

A. SafetyFoam Pro resilient subsurface padding will be laid out in 2’x4’ interlocking panels over the base.

B. Artificial Turf: The turf will be rolled out in sections, cut around the poles, and seamed together using the micromechanical seaming system as the primary bond.

C. Securing: The turf will be secured around the perimeter. If using nailer boards, 1” stainless steel staples will be used to secure the turf to the boards. Staples will be placed every 3”. (See edge details).

D. Protection: Surface installer shall be responsible for the protection of the rubber surface during the installation process. Surface installer shall be responsible for the protection of the surface during the curing period upon completion of the installation.

END OF SECTION

SECTION 02826 - ORNAMENTAL METAL FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Decorative aluminum fences.
   2. Swing gates.
   3. Sliding gates.

B. Related Sections:

   1. Division 2 Section "Earthwork" for site excavation, fill, and backfill where decorative metal fences and gates are located.
   2. Division 3 Section "Cast-in-Place Concrete" for concrete bases for gate operators, drives, and controls, post concrete fill.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.
   1. Product Data: Submit product data for fabric, posts, accessories, fittings, and hardware.
   2. Shop Drawings: Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorage's, and schedule of components.
   3. Signed and Sealed Engineering Drawings and Calculations - Contractor shall provide engineered, signed and sealed shop drawings by a Florida Registered Engineer to comply with ASCE 7-16 and Florida Building Code, Latest Edition. Size and spacing of posts, rails, gates and footings shall comply with engineering supplied by contractor’s engineer, but not less than sizes and spacing specified in the construction documents.
   4. Wiring Diagrams: For power, signal, and control wiring.
   5. Submit drawings showing connections to adjacent construction, range of travel, and all electrical and mechanical connections to the operator. Drawings shall also show the size and location of the concrete mounting pad. Underground electrical runs shall be shown on shop drawings.

C. Installation Instructions: Submit two copies of manufacturer's installation instructions for this specific project.

D. Samples: For each fence material and for each color specified.

   1. Provide Samples 12 inches in length for linear materials.

E. Welding certificates.

F. Maintenance Data: For gate operators to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Installer: A minimum of three years experience installing similar equipment.

C. All fieldwork shall be performed in a neat and professional manner, completed to journeyman standards.

D. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators on gates that must provide emergency access.

1.5 CODES AND REGULATORY REQUIREMENTS

A. Before submitting a proposal, the Contractor shall become familiar with the rules of the governing boards having jurisdiction and shall notify the Owners Representative before submitting a proposal, if in the Contractors opinion, any work or material specified is contrary to such rules. Otherwise, the Contractor is responsible for the approval of all work or material at no extra cost to the Owner, and in case the use of any material specified is not permitted, a substitute shall be approved by the Owners Representative and shall be provided at no extra cost.

B. Work to conform to the latest editions of the following (when applicable):
1. Florida Building Code, Latest Broward County Edition (F.B.C.)
2. National Electric Code (N.E.C.)
3. National Electrical Manufacturers Association (N.E.M.A.)
4. All other applicable city, state and national codes
5. Underwriters' Laboratories Inc. (U.L.), listings
6. American Society for Testing and Materials (A.S.T.M.)
7. Occupational Safety and Health Administration (O.S.H.A.)
8. Wind Loads – ASCE 7-16 – 170 mph wind speed, Exposure C, Category II

1.6 PRODUCT DELIVERY AND STORAGE

A. Store products upright in the original shipping containers, covered, ventilated and protected from all weather conditions.

1.7 WARRANTY

A. Provide a two-year comprehensive warranty against all defects in materials or workmanship. Defective materials shall be replaced with comparable materials furnished by the manufacturer, at no cost to the owner. Freight, labor and other incidental costs must be covered under the factory warranty.

1.8 SAFETY REQUIREMENTS

A. Do not locate any device (key switch, switch, key pad, card reader, etc.) In a position where it may be activated by a person reaching through the gate or while touching the gate in any manner.

PART 2 - PRODUCTS

2.1 ALUMINUM

A. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.

B. Extrusions: ASTM B 221, Alloy 6063-T5.

C. Tubing: ASTM B 429, Alloy 6063-T6.

D. Plate and Sheet: ASTM B 209, Alloy 6061-T6.

E. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.

F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.2 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welding.

1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for strength and compatibility in fabricated items.

B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Division 3 Section "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 4000 psi, 3-inch slump, and 1-inch maximum aggregate size.

C. Non-shrink Grout: Factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107 and specifically recommended by manufacturer for exterior applications.

2.3 GROUNDING MATERIALS

A. Grounding Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.

1. Material above Finished Grade: Aluminum.
2. Material on or below Finished Grade: Copper.
3. Bonding Jumpers: Braided copper tape, 1 inch wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.

B. Grounding Connectors and Grounding Rods: Comply with UL 467.

1. Connectors for Below-Grade Use: Exothermic-welded type.
2. Grounding Rods: Copper-clad steel.

a. Size: 5/8 by 96 inches.

2.4 MATERIAL

A. Aluminum material for fence framework (i.e., tubular pickets, rails and posts) shall conform to the requirements of ASTM B221. The aluminum extrusions for posts and rails shall be Alloy and Temper Designation 6005-T52. The aluminum extrusions for pickets shall be Alloy and Temper Designation 6063-T52.

B. The manufactured framework shall be subjected to the Ameristar thermal stratification coating process (high-temperature, in-line, multi-stage, and multi-layer) including, as a minimum, a six-stage pretreatment/wash and an electrostatic spray application of a polyester finish. The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be (specify Black, Bronze, White, or Desert Sand). The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2.

C. Material for fence pickets shall be 1" square x 0.062" thick extruded tubing. The cross-sectional shape of the rails shall conform to the manufacturer's ForeRunner™ design with outside cross-section dimensions of 1.75" square. The top wall and internal web of the rail shall be 0.070" thick; the sidewalls shall be 0.070" thick for superior vertical load strength. Picket holes in the ForeRunner rail shall be spaced 4.715" o.c., except for Invincible style 6' long, which shall be, spaced 4.98" o.c. Picket retaining rods shall be 0.125" diameter galvanized steel. Fence posts and gate posts shall meet the minimum size requirements of Table 1. High quality PVC grommets shall be supplied to seal all picket-to-rail intersections.

D. All fasteners shall be stainless steel. Bracket to rail attachments shall be made using specially designed one-way tamperproof security bolts with inverted "t-nuts". Bracket to post connections shall be made using self-drilling hex-head screws.

E. Aluminum castings shall be used for all rings, post caps, finials, and miscellaneous adornments.

2.5 FABRICATION

A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.

B. The rail inner slide shall be fully inserted into the rail outer channel to form the raceway for the internal retaining rod. Grommets shall be inserted into the pre-punched holes in the rails, and pickets shall be inserted through the grommets so that pre-drilled picket holes align with the internal raceway of the two-part ForeRunner rails. (Note: This can best be accomplished by using an alignment template). Retaining rods shall be inserted into each ForeRunner rail so that they pass through the pre-drilled holes in each picket, thus completing the panel assembly.

C. Completed panels shall be capable of supporting a 300 lb. load (applied at midspan) without permanent deformation. Panels shall be biasable to a 25% change in grade.

D. Swing Gates shall be fabricated using 1.75" sq. reinforced ForeRunner rail material, 2" sq. x .250" gate ends, and 1" sq. x .125" pickets. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall be joined by welding.

E. 6' wide or larger Aluminum Frames and Bracing: Fabricate members from square tubing.
   1. Frame Members: Extruded-aluminum tubes 2-1/2 by 2-1/2 inches with 0.154-inch wall thickness.
   2. Bracing Members: Extruded-aluminum tubes 2-1/2 by 2-1/2 inches with 0.154-inch wall thickness.

F. Frame Corner Construction:
   1. Welded frame and 5/16-inch- diameter, adjustable truss rods for panels 4 feet wide or wider.

G. Additional Rails: Provide as indicated, complying with requirements for fence rails.

H. Infill: Comply with requirements for adjacent fence.

I. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.

J. Hardware: Latches permitting operation from both sides of gate, locking devices, hinges, hardware items and accessories, and stops fabricated from mill-finished, Grade 319 aluminum-alloy casting with stainless-steel fasteners. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.
   1. Contractor to Supply Padlocks - Schlage Primus series.
   2. Contractor shall provide Knox Box for fire department access.

K. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.

L. Aluminum Finish: Clear Anodized.

2.6 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 2 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   1. Color and Gloss: Clear Anodized, confirm with owner.

Table 1 – Coating Performance Requirements

Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 3,500 hours (Scribed per D1654; failure mode is accumulation of 1/8” coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625” ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.

B. Do not begin installation before final grading is completed unless otherwise permitted by Owner.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
   1. Construction layout and field engineering are specified in Division 1 Section "Execution Requirements."

3.3 DECORATIVE FENCE INSTALLATION

A. Install fences according to manufacturer's written instructions.

B. Install fences by setting posts as indicated and fastening rails

C. Post Excavation: Drill or hand-excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter and depth of not less than that show on engineered shop drawings.

D. Post Setting: Set posts in concrete at 6'-0" o.c. spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      a. Exposed Concrete: Extend 2 inches above grade. Finish and slope top surface to drain water away from post.
      b. Concealed Concrete: Top 2 inches below grade to allow covering with surface material. Slope top surface of concrete to drain water away from post.

E. Posts Set in Concrete: Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.

F. Space posts uniformly at 6 feet o.c.

3.4 GROUNDING AND BONDING

A. Fence Grounding: Install at maximum intervals of 1500 feet except as follows:
   1. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.
   2. Gates and Other Fence Openings: Ground fence on each side of opening.

B. Bond metal gates to gate posts.
   1. Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
   2. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.

C. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.

D. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

E. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
   1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
   2. Make connections with clean, bare metal at points of contact.
   3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
   4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
   5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.5 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware, and other moving parts.

3.6 TRAINING AND DOCUMENTATION

A. Procure all the necessary and usual inspections and certificates for all work to be installed. Deliver same to the owner/ end user before final acceptance.

B. Provide three copies of "operations and maintenance", manual for the owner's use. Manuals will identify parts of the equipment for future procurement.

C. Installer must provide extra parts to the owner, as specified.

END OF SECTION 02826

SECTION 02886 – PRE-ENGINEERED SHADE STRUCTURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General conditions and division 1 Specification Sections apply to this section.

1.2 SUMMARY

A. The shade structure contractor shall be responsible for the design, engineering, fabrication, supply and installation of the work specified here in. The intent of this specification is to have only one single contractor be responsible for all the above functions.

1.3 CODE AND REGULATORY REQUIREMENTS

A. Engineered Shop Drawings Shade Structure Construction to conform to the latest editions of the following:
   1. Florida Building Code, (F.B.C.) 2020 - HVHZ with latest revisions.
   2. All other applicable city, state and national codes
   3. American Society for Testing and Materials (A.S.T.M.)
   4. Occupational Safety and Health Administration (O.S.H.A.)
   5. Wind Loads – ASCE 7-16 – 170 mph wind speed, Exposure C, Category II

B. American Welding Society: Structural Welding Code AWS D1.1-AWS Structural Welding Code-Steel.

C. Engineered Shop Drawings: For the following, showing compliance with building code in effect for Project:
   1. Prefabricated engineered shade system shall be designed by a State of Florida registered professional engineer (delegated engineer) and fabricated in accordance with the Florida Building Code. Such shop drawings shall be submitted to the building official for review and approval. The shop drawings shall meet the following requirements:
      a. All shop drawings shall be in conformity with the architect or engineer of record plans unless prior written approval is obtained from the architect or engineer of record.
      b. A size 8½ -inches by 11-inches cut sheets showing individual member design shall also be furnished to the architect or engineer of record.
      c. The size and location of all structural members shall be shown on the shop drawings.
      d. Shade shop drawings shall indicate the support and minimum bearing of the shade structural system, the permanent cross/lateral bracing, bracing to transfer member buckling forces to the structure and all bracing and anchorage required to resist uplift and lateral forces.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Engineered Shop Drawings: Show the following:
   1. Plans, sections, elevations, dimensions, clearances, foundations, etc.
   2. Installation details.
   3. Fabric Colors and pattern.
   4. Accessories.

C. Samples for Initial Selection: For each material indicated – Min. (2) 1' x 1'.

D. Material Test Reports: For shade fabric, signed by manufacturers.
   1. Flammability test results

E. Material Certificates: For each product, signed by manufacturers.

F. Field quality-control test reports.

G. Operations and Maintenance Data.

H. Warranty: Special warranty specified in this Section.

I. Installer Qualifications

1. The installation of Shade Structures shall be provided by a firm experienced in this type of work.

J. Provide proof of all quality assurance items including:

1. Proof of general liability, professional liability, and umbrella insurance as per section 1.5C.
2. Proof of a minimum of $6,000,000 aggregate bonding capacity as per Section 1.5D.
3. Proof of a Corporate Safety Program along with an injury and Illness Prevention Program.
4. Proof of an Annual Maintenance Inspection Program.
5. Proof of a Corporate Quality Control Manual as per Section 1.5F

1.5 QUALITY ASSURANCE

A. A single shade contractor shall design, engineer, manufacture, and erect the shade structure(s).

B. All bidders shall have at least 15 years' experience in the design, engineering, manufacturing, and installation of shade structures.

C. All bidders shall engineer to FBC 2020 requirements with similar scope.

D. All bidders shall be able to provide proof of a minimum of $1,000,000 general/public liability insurance, $3,000,000 professional liability (PL) insurance, and an additional $5,000,000 umbrella/excess liability insurance.

E. All bidders shall be licensed and bonded with a minimum bonding capacity of $6,000,000.

F. The shade structure contractor shall have a Corporate Quality Control program and manual describing their complete quality assurance program.

G. All bidders must have an in-house warranty and service department to assist in repairs and service calls.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for the shade structure(s) shown on the project drawings in relation to the property survey and existing structures, and verify locations by field measurements prior to construction for the shade structures.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit system installation to be performed according to manufacturers' written instructions and warranty requirements.

C. Products shall be stored out of site (as much as possible) and secured the same to prevent damage.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of playground shade system that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Deterioration of shade structure and other materials beyond normal weathering.
   b. Rips in shade fabric or stitch separation.
   c. Mechanical failure.
2. Warranty Period:
   a. Provide a non-prorated warranty from the manufacturer for a period of ten (10) years on fabric including stitching and twenty (20) years on the structural integrity of the steel, from date of substantial completion.
3. The Contractor shall provide a one (1) year warranty on all labor and materials from date of substantial completion.
4. When defective material or workmanship is discovered which requires repair or replacement, all such repair work or replacement work shall be done by the CONTRACTOR at its own expense after written notification is given of such required repairs. However, if the CONTRACTOR fails to comply with the requirements of the above guarantee within (5) working days after notification is given, the OWNER shall proceed to have the repairs made by others at the CONTRACTOR'S expense.
   a. Any unsafe conditions that arise shall be secured and maintained by the installer until all required repairs or replacements have been completed.
   b. All repairs shall conform in kind and quality to the specifications set forth in the plans and specifications and shall be free of defects in workmanship and material.

PART 2 – PRODUCTS

2.1 GENERAL

A. Scope

1. Refer to Contract Documents for shade size, location, etc.

B. Manufacturer

The proposed shade structure(s) to be manufactured by Superior Recreational Products Shade Division, also recognized as (SRP Shade or Superior Shade) or approved equal, shall be modular and pre-fabricated, and include the structural steel frame, fabric roof, steel cables and all fasteners.

1. SRP Shade
   1050 Columbia Dr.
   Carrollton, GA 30117
   (866) 959-8004
   www.SRPShade.com
2. Or Approved Equal: Standard for approved equal. Ten (10) days prior approval required for substitution of product design, materials and features specified above. Submittals must include plans, drawings, cut sheets, material data sheets, testing results and samples. Bids failing to meet this requirement will be deemed non-responsive.

C. Contractor to provide concrete slab, post foundations, and engineered shop drawings for shade structures. Coordinate electrical hook-up with electrical drawings and owner's equipment.

1. Top of slab shall be flush with top of adjacent finish surfaces.
2. Structures shall be engineered to meet or exceed the requirements of Florida Building Code (FBC), and the following standard specifications:
3. Wind Speed (Frame only): 170 M.P.H.

4. Wind Speed (Frame w/canopy): 90 M.P.H.
5. Live Load: -/+ 00 psf

D. Materials Fabric Specifications Manufactured as ALNET ExtraBlock
1. The fabric knit is to be made using Monofilament and tape HDPE yarns.
2. UV shade fabric is made of UV stabilized materials.
3. The high-density polyethylene material shall be manufactured with tensioned fabric structures in mind.
4. Shade fabric has a weight Ave. of 9.6oz. sq. yd.
5. Material to be Rachel-knitted to ensure material will not unravel if cut.
6. Burst Strength of 363 lb. (ASTM 3786)
7. Cloth meets fire resistance tests as follows:
   a. Alnet Extra Block: California State fire Marshall Reg. #F-93501
b. Others: NFPA 701-99 (Test Method 2). ASTM E-84
8. Fabric Properties:
   a. Tear Tests (lbs/ft): WARP 33 and WEFT 36 (ASTM D2261)
   b. Burst Test (lbs ft): 363 lbs. (ASTM D3787)
   c. Fabric Weight (oz/sqFT) Average: 1.02 to 1.07
   d. Roll Length 150’
   e. Roll Size: 63” x 16.5”
   f. Weight: 120 lbs.
   g. Life Expectancy: 10 Years
   h. Fading: Minimum fading after 6 years (Note: 3 years for Red and Yellow)
   i. Minimum Temperature: -77 degrees F
   j. Maximum Temperature: 167 degrees F

E. Thread
1. Shall be 100% expanded PTFE fiber which carries a 10-year warranty that is high strength and low shrinkage.
2. Shall have a wide temperature and humidity range.
3. Abrasion resistant and UV radiation immunity.
4. Shall be unaffected by non-hydrocarbon based cleaning agents, acid rain, mildew, rot, chlorine, saltwater, and pollution.
5. Lockstitch thread – 1200 Denier or equal.
6. Chain stitch thread – 2400 denier or equal

F. Steel Tubing
1. All fabricated steel must be in accordance with approved shop drawings and calculations.
2. All steel is cleaned, degreased or etched to ensure proper adhesion of powder-coat in accordance with manufactures specifications.
3. All Steel used on this project needs to be new and accompanied by the mill certificates if requested. Structural steel tubing up to 5”-7 gauge shall be galvanized per Allied Steel FLO-COAT specifications. Schedule 49 black pipe fabrications shall be sandblasted and primed as described below.
4. All non-hollow structural shapes comply with ASTM A-36, unless otherwise noted.
5. All hollow structural steel shapes shall be colf formed HSS ASTM A-53 grade C, unless otherwise noted.
6. Plate products shall comply with ASTM A-36.

G. Powder Coating and Priming
1. All steel (galvanized and non-galvanized) must be coated with rust inhibiting primer prior to applying the powder coat. Primer shall be Marine Grade Cardinal Industrial Finishes Corp. E396 – GR1372 epoxy powder coating semi-gloss smooth zinc rich primer.
2. All non-galvanized steel shall be sandblasted and primed prior to powder coating using brown fused aluminum oxide grit and the aforementioned primer.
3. All steel parts shall be coated for rust protection and finished with a minimum 3.5 mil thick UV-inhibited weather resistant powder coating.

4. Power used in powder-coat process shall have the following characteristics:
    a. N.3.1 | Specific Gravity | 1.68+/-0.05
    b. N.3.2 | Theoretical Coverage | 114+/-4 ft. 2/lb/mil
    c. N.3.3 | Mass Loss During Cure | <1%
    d. N.3.4 | Maximum Storage Temperature | 75 degrees F
5. Powder-coating shall meet the following tests:
    a. ASTM | Gloss at 60 | 85 to 95
    b. HOI TM 10.219 | PCI Powder Smoothness | 7
    c. ASTM D2454-91 |Over-Bake Resistance Time | 200%
    d. ASTM D3363-92A | Pencil Hardness | H-2H
    e. ASTM D2794-93 | Dir/Rev Impact, Gardner | 140/140 in./lbs
    f. ASTM D3359-95B | Adhesion, Cross Hatch | 5B PASS
    g. ASTM D522-93A | Flexibility Mandrel | ¼" Diameter, No Fracture
    h. ASTM B117-95 | Salt Spray | 1000 Hours
    i. UL Dtov2 | Organic Coating Steel Enclosures, Elect Eq. | Recognized
6. Application Criteria:
    a. 5.1 | Electrostatic Spray Cold | Substrate: 0.032 in. CRS
    b. N.5.2 | Cure Schedule | 10 Minutes at 400 degrees F
    c. N.5.3 | Pretreatment | Bonderite 1000
    d. N.5.4 | Film Thickness | 3.5 Mils

H. Welding
1. All shop welds shall be executed in accordance with the latest edition of the American Welding Society Specifications.
2. Welding procedures shall comply in accordance with the AWS D1.1-AWS Structural Welding Code-Steel.
3. All welds to be performed by a certified welder. All welds shall be continuous where length is not given unless otherwise shown or noted on drawings.
4. All welds shall develop the full strength of the weaker member. All welds shall be made using E70xx.035 wire.
5. Shop connections shall be welded unless noted otherwise. Field connections shall be indicated on the drawings. Field welded connections are not acceptable.
6. All filet welds shall be a minimum of ¼" unless otherwise noted.
7. All steel shall be welded shut at terminations to prevent internal leakage.
8. Internal weld sleeving is not acceptable.
9. On-site welding is not acceptable.

I. Sewing
1. On-site sewing of a fabric will not be accepted
2. All corners shall be reinforced with Kevlar® extra non-tear cloth and strap to distribute the load.
3. The perimeters that contain the cables shall be double lock stitched.

J. Installation Hardware
1. Bolt and fastening hardware shall be determined based on calculated engineering loads.
2. All bolts shall comply with SAE-J429(Grade 8) or ASTM A325 (Grade BD). All nuts shall comply with the ASTM F-594, alloy group 1 or 2.
3. Upon request, Stainless Steel hardware shall comply with ASTMA-304.
4. ¼" galvanized wire rope shall be 7x19 strand with a breaking strength of 7,000 lbs. for shades generally under 575 sq. ft. unless requested larger by the customer. For shades over 575 sq. ft., cable shall be 5/16" with a breaking strength of 9,800 lbs. Upon request, ¼" Stainless Steel wire rope shall be 7x19 strand with a breaking strength of 6,400 lbs. 5/16" Stainless steel wire rope shall be 7/19strand with a breaking strength of 9,000 lbs.
5. All fittings required for proper securing of the cable are hot dipped galvanized.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installations of shade structure(s) shall be performed by an installer who shall follow the manufacturer's instructions for assembly, installation, and erection, per approved drawings.

B. Concrete
   1. Concrete work shall be executed in accordance with the latest edition of American Concrete Building Code ACI 318 unless specified by the governing municipality.
   2. Concrete specifications shall comply in accordance with, and detailed as per plans as follows:
      a. 28 days Strength F'c = 3500 psi
      b. Aggregate: HR
      c. Slump: 3-5
      d. Portland Cement shall conform to C-150
      e. Aggregate shall conform to ASTM C-33
   3. All reinforcement shall conform to ASTM A-615 grade 60
   4. Reinforcing steel shall be detailed, fabricated and placed in accordance with the latest ACI Detailing Manual and Manual of Standard Practice.
   5. Whenever daily ambient temperatures are below 80 degrees Fahrenheit, the contractor may have mix accelerators and hot water added at the batch plant. (see table 1)
   6. TABLE 1

Temperature Range	**% Accelerator**	**Type Accelerator**
75-80 degrees	1%	High Early (non calcium)
70-75 degrees	2%	High Early (non calcium)
Below 70 degrees	3%	High Early (non calcium)

C. Footings
   1. All anchor bolts set in new concrete shall be ASTM A-307, or ASTM F-1554 if specified by engineer.
   2. All anchor bolts shall be zinc plated unless specified otherwise.
   3. Footing shall be placed in accordance with and conform to engineered specifications and drawings.

3.2 PROTECTION

A. Protection - Contractor shall be responsible for the protection of the surfacing and playground during the installation process. Contractor shall be responsible for the protection of the shade system after completion of the installation

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Footings.
   2. Foundation walls.
   3. Slabs-on-grade.
   4. Suspended slabs.
   5. Concrete toppings.
   6. Building frame members.
   7. Building walls.

B. Related Sections include the following:
   1. Division 2 Section "Earthwork"
   2. Division 2 Section "Concrete Pavement Curbs and Walkways"
   3. Division 3 Section "Cast-in-Place Architectural Concrete”

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
   1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.

4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Curing compounds.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Vapor retarders.
11. Semirigid joint filler.
12. Joint-filler strips.
13. Repair materials.

F. Field quality-control test and inspection reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301-16, "Specification for Structural Concrete," Sections 1 through 5 and Section 7, "Lightweight Concrete."
2. ACI 117-10, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Mockups: Cast concrete slab-on-grade panels to demonstrate integral color, typical joints, surface finish, texture, tolerances, and standard of workmanship.
1. Build panel approximately 10 sq. ft. for column and beam minimum 60 days prior to actual pour.
2. Include both integral colors (if any), joints, and sealers representing actual installation.
3. Build mockups of typical exterior wall of cast-in-place architectural concrete as shown on Drawings.
4. Demonstrate curing, cleaning, and protecting of cast-in-place architectural concrete, finishes, and contraction joints, as applicable.

5. In presence of Architect, damage part of the exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
6. Obtain Architect's approval of mockups before casting architectural concrete.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
   a. Contractor's/Construction Manager's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete subcontractor.
   e. City's Representative
   f. Minutes of the meeting shall be recorded, typed, and distributed by the Contractor to all concerned parties, including but not limited to the Owner's representative and the Architect within five days of the meeting.
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. Structural 1, B-B or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.

C. Plain-Steel Wire: ASTM A 82, galvanized.

D. Deformed-Steel Wire: ASTM A 496.

E. Stainless-Steel Reinforcing Bars: ASTM A 955/A 955M, Grade 60, Type 316L, deformed.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. Where legs of wire bar supports contact forms, use gray, all-plastic bar supports or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I, gray.

B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
   1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C 330, 3/4-inch nominal maximum aggregate size.

D. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.
   1. Do Not use Air-Entraining Admixture in concrete scheduled to receive polished finish.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
   1. Available Products:
      a. Cortec Corporation; MCI 2005NS.
      b. Grace Construction Products, W. R. Grace & Co.; DCI-S.
      c. Master Builders, Inc.; Rheocrete 222+.
      d. Sika Corporation; FerroGard-901.
      e. Or Approved Equal

D. Shrinkage Reducing and Compensating Admixture: ASTM C 878 or Modified ASTM C157
   1. Available Products:
      a. Euclid Chemical; Conex.
      b. Or Approved Equal

2.7 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
   1. Available Products:
      a. Stego; Stego Wrap Vapor Barrier 15 mil
      b. Fortifiber Corporation; Moistop Ultra 15.
      c. Raven Industries Inc.; Vapor Block 15.
      d. Reef Industries, Inc.; Griffolyn Type-105.
      e. ISI Building Products; Viper Vaporcheck II 15 mil
      f. Or Approved Equal

2.8 CURING MATERIALS

A. Curing Compound:
   1. Kurez RC-100 removable curing compound by Euclid Chemical.
   2. Kurez DR VOX dissipating curing compound by Euclid Chemical.

B. Or wet curing for a minimum of 14 days and a maximum of 28 days using the following materials.
   1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
   2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
   3. Water: Potable.

2.9 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 8139, semi-rigid, Preformed Expansion Joint Filler or Slab Isolation Joint Filler with typical thickness 1/2, 3/4, or 1 inch and height equal to slab thickness with a removable top section for creation of a sealant void.
   1. Materials: Provide a semi-rigid, closed-cell polypropylene foam, preformed joint filler that fully complies with ASTM D8139. NOMAFLEX® by Nomaco, Inc.
      a. Manufacturers: Nomaco, Inc., 501 Innovative Way, Zebulon, NC 27597. Phone (877) 291-1157. Fax (919) 269-7936. Website: https://www.nomaco.com/product/nomaflex/
      b. "Deck-O-Foam" by W.R. Meadows
   2. Or Approved Equal

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
   1. Types I and II, non-load bearing, IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.0217-inch- thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

C. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures.
5. Use shrinkage reducing and compensating admixture in concrete mixtures for parking deck topping slab and drain area.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd.
3. Maximum Water-Cementitious Materials Ratio: 0.40.
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
7. Air Content: Do not allow air content of polished finish floors to exceed 1 percent.
8. Steel-Fiber Reinforcement: Add to concrete mixture, according to manufacturer's written instructions, at a rate of 50 lb/cu. yd.

9. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.

D. Building Frame Members: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.40.
   3. Slump Limit: 5 inches, plus or minus 1 inch.
   4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

E. Building Walls: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.40.
   3. Slump Limit: 5 inches, plus or minus 1 inch.
   4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
   5. Air Content: Do not allow air content of polished finish wall panels to exceed 1 percent.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class A, 1/8 inch for smooth-formed finished surfaces.
   2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
   1. Leave formwork and shores for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
   1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
3. Contraction Joints shall be placed within 6 hours of placing concrete.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
   1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Finish concrete slabs shall have a minimum Floor Flatness rating of at least 50.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces indicated and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
      a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

D. See section 07900 - Joint Sealers for expansion joints.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contractor/Construction Manager will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:
1. Steel reinforcement placement.
2. Headed bolts and studs.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.
6. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.

a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor/Construction Manager shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor/Construction Manager within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's/Construction Manager's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Construction Documents.

END OF SECTION

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.

B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

D. Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.

E. Paint application for structural steel frames is specified in Division 9.

F. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
   1. Promptly remove and replace materials or fabricated components which do not comply.

G. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.
   1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

H. **All structural steel exposed to exterior environmental conditions shall be hot dipped galvanized.**

I. All Exposed steel visible within 30 feet shall be designed and fabricated to comply with ANSI/AISC 303-16 An American National Standard Code of Standard Practice for Steel Buildings and Bridges June 15, 2016 - SECTION 10. ARCHITECTURALLY EXPOSED STRUCTURAL STEEL - **AESS 4: Showcase elements with special surface and edge treatment beyond fabrication.**

1.3 SUBMITTALS:

A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

B. Shop Drawings: Submit shop drawings prepared under supervision of a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.

C. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length, and type of each weld.
   1. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of others sections.

D. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.4 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
   1. ANSI/AISC 303-16 - An American National Standard Code of Standard Practice for Steel Buildings and Bridges, June 15, 2016
   2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
   3. AISC "Specifications for Architecturally Exposed Structural Steel".
   4. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
   5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
   6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
   7. ASTM A123 / A123M - 12 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   8. ASTM A153 / A153M - 09 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   9. ASTM B695 - 04 (2009) Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

B. Qualifications for Structural Steel Fabrication: Structural Steel frames to be fabricated off site by a steel fabricator with a minimum of 10 years Broward County experience and an AISC category II rating or better. Steel fabricators must indicate with letter on transmittal that he has reviewed the full set of drawings: mechanical, electrical, structural, etc. Include letter, resume and past projects with bid proposal.

C. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

D. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
   1. If recertification of welders is required, retesting will be Contractor's responsibility.

1.5 MOCK UP

A. A mock-up shall be required for all exposed steel within 30 feet of view and designated as AESS 4.

B. Mockup shall be submitted, reviewed, and approved prior to steel fabrication.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

B. Structural Steel Shapes, Plates and Bars: ASTM A 36.

C. Cold-Formed Steel Tubing: ASTM A 500, Grade B.

D. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.
   1. Finish: Black, except where indicated to be galvanized.

E. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC Specifications.

F. Anchor Bolts: ASTM A 307, non-headed type unless otherwise indicated.

G. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low- carbon steel bolts and nuts.
   1. Provide hexagonal heads and nuts for all connections.

H. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
   1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.
   2. Direct tension indicator washers may be used at Contractor's option.

I. Electrodes for Welding: Comply with AWS Code.

J. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CE-CRD-C621.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Euco N.S. - Euclid Chemical Co.
      b. Crystex - L&M Construction Chemicals
      c. Masterflow 713 - Master Builders
      d. Five Star Grout - U.S. Grout Corp.
      e. Upcon - Upco Chem. Div., USM Corp.
      f. Propak - Protex Industries, Inc.
      g. Set Non-Shrink - Set Products, Inc.

2.2 FABRICATION:

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

B. Properly mark and match-mark materials for field assembly.

C. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

D. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

E. Connections: Weld or bolt shop connections, as indicated.

F. Bolt field connections, except where welded connections or other connections are indicated.
   1. Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.

G. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

H. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

I. Steel Wall Framing: Select members which are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square and true members in completed wall framing.

J. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10" o.c., unless otherwise indicated.

K. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

L. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

M. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

N. All Exposed steel visible within 30 feet shall be designed and fabricated to comply with ANSI/AISC 303-16 An American National Standard Code of Standard Practice for Steel Buildings and Bridges June 15, 2016 - SECTION 10. ARCHITECTURALLY EXPOSED STRUCTURAL STEEL - **AESS 4: Showcase elements with special surface and edge treatment beyond fabrication.**
   1. Showcase elements in AESS 4 are those for which the designer intends that the form is the only feature showing in an element. All welds are ground and filled, edges are ground square and true. All surfaces are filled and sanded to a smoothness that doesn't catch on a cloth or glove. Tolerances of fabricated forms are more stringent—generally half of standard tolerance. AESS 4 involves the use of a mock-up and acceptance is based upon the approved conditions of the mock-up.
      a. 4.1 HSS seams are treated so they are not apparent.
      b. 4.2 In addition to a contoured and blended appearance, welded transitions between members also are contoured and blended.

c. 4.3 The steel surface imperfections are filled and sanded.
d. 4.4 Weld show-through on the back side of a welded element can be minimized by hand grinding the back side surface. The degree of weld-through is a function of weld size and material.

2. The permissible tolerances for member depth, width, out of square, and camber and sweep shall be as specified in ASTM A6/A6M and ASTM A500/A500M. The following exceptions apply:
   a. For Categories AESS 3 and 4, the matching of abutting cross sections shall be required.
   b. For Categories AESS 2, 3 and 4, the as-fabricated straightness tolerance shall be one-half of that specified in ASTM A6/A6M and ASTM A500/A500M.
3. The tolerance on overall profile dimensions of welded built-up members shall meet the requirements in AWS D1.1/D1.1M. For Categories AESS 2, 3 and 4, the as-fabricated straightness tolerance for the member as a whole shall be one-half of that specified in AWS D1.1/D1.1M.
4. For Categories AESS 3 and 4, copes, miters and cuts in surfaces exposed to view shall have a gap that is uniform within 1/8 in. (3 mm), if shown to be an open joint. If instead the joint is shown to be in contact, the contact shall be uniform within 1/16 in. (2 mm).
5. For Categories AESS 1, 2 and 3, the surface condition of steel given in ASTM A6/A6M shall be acceptable. For Category AESS 4, surface imperfections shall be filled and sanded to meet the acceptance criteria established with the mock-up required.
6. For Categories AESS 1, 2 and 3, welds shall meet AWS D1.1/D1.1M requirements, except that weld spatter exposed to view, if any, shall be removed. For Category AESS 4, welds shall be contoured and blended, and spatter exposed to view, if any, shall be removed.
7. For Categories AESS 1 and 2, weld projection up to 1/16 in. (2 mm) is acceptable for butt and plug welded joints. For Categories AESS 3 and 4, welds shall be ground smooth/filled.
8. For Categories AESS 1, 2 and 3, weld show-through shall be acceptable as produced. For Category AESS 4, the fabricator shall minimize the weld show-through.
9. AESS shall be prepared to meet the requirement of SSPC-SP 6. Prior to blast cleaning:
   a. Grease or oil, if any is present, shall be removed by solvent cleaning to meet the requirements of SSPC-SP 1.
   b. Weld spatter, slivers and similar surface discontinuities shall be removed.
   c. Sharp corners resulting from shearing, flame cutting or grinding shall be eased.
   d. For Categories AESS 1 and 2, seams of hollow structural sections shall be acceptable as produced. For Category AESS 3, seams shall be oriented as specified in the contract documents. For Category AESS 4, seams shall be treated so they are not apparent.

2.3 GALVANIZING:

A. All structural steel shall be hot dipped galvanized – G90 or better.

B. Prepare structural component surfaces in accordance with SPC SP 3.

C. Galvanizing for Structural Steel Members: ASTM A123 / A123M - 12; minimum 2.0 oz/sq ft coating thickness; hot dipped galvanized after fabrication.

D. Galvanizing for Fasteners, Connectors, and Anchors:
   1. Hot-Dipped Galvanizing: ASTM A153 / A153M - 09.
   2. Mechanical Galvanizing: ASTM B695 – 04 (2009); Class 50 minimum.

E. All structural steel deck shall be hot dipped galvanized – G90 or better.

F. Touch up galvanized coating where field welding is required.

G. Exposed Structural Steel: See section 09900 for specific information in reference to protective finish for all exposed hot dipped galvanized coated steel.

PART 3 - EXECUTION

3.1 ERECTION:

A. Surveys: Employ a registered professional engineer or land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Design-Build Criteria Professional. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Design-Build Criteria Professional.

B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

E. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

F. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

G. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
   1. For proprietary grout materials, comply with manufacturer's instructions.

H. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure within specified AISC tolerances.

I. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

J. Splice members only where indicated and accepted on shop drawings.

K. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

L. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

M. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

N. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

O. Touch-Up Galvanic Coating: Immediately after erection, clean field welds, bolted connections, and abraded areas. Apply liquid galvanic coating to exposed areas.

P. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

Q. AESS Erection
1. The erector shall use special care in unloading, handling and erecting AESS to avoid marking or distorting the AESS. The erector shall plan and execute all operations in such a manner that allows the architectural appearance of the structure to be maintained:
   a. Slings shall be nylon-type or chains or wire rope with softeners.
   b. Care shall be taken to minimize damage to any shop paint or coating.
   c. When temporary braces or fixtures are required to facilitate erection, care shall be taken to avoid any blemishes, holes or unsightly surfaces resulting from the use or removal of such temporary elements.
   d. Tack welds not incorporated into final welds shall be ground smooth.
   e. All backing and runoff tabs shall be removed and the welds ground smooth.
   f. All bolt heads in connections shall be on the same side, as specified, and consistent from one connection to another.
   g. <u>For Category AESS 4, open holes shall be filled with weld metal or body filler and smoothed by grinding or filling to the standards applicable to the shop fabrication of the materials.</u>

3.2 QUALITY CONTROL:

A. Contractor/Construction Manager shall engage and pay for an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations there from.

C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.

E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's/Construction Manager's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

F. Field Bolted Connections: Inspect in accordance with AISC specifications.

G. Field Welding: Inspect and test during erection of structural steel as follows:
1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.

END OF SECTION

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF WORK:

A. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

B. Extent of metal fabrications is indicated on drawings and schedules.

C. Types of work in this section include metal fabrications for:
   1. Rough hardware
   2. Loose bearing and leveling plates
   3. Loose steel lintels
   4. Miscellaneous framing and supports
   5. Miscellaneous steel trim
   6. Shelf angles
   7. Steel pipe railings

D. Structural steel is specified in another section within Division 5.
Paint application for structural steel frames is specified in Division 9.

1.3 SYSTEM PERFORMANCES:

A. Structural Performances: Provide assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.

B. All Assemblies shall comply the Florida Building Code 2020 and ASCE 7-16.
   1. Handrails and Toprails: Capable of withstanding the following loads applied as indicated when tested per ASTM E 935.
      a. Concentrated loads of 200 lbs. applied at any point in any direction.
      b. Uniform load of 50 lbs per linear ft. applied simultaneously in both vertical and horizontal directions.
   2. Guards: Intermediate rails, balusters and panel fillers capable of withstanding a uniform load of 25 lb. per sq. ft. of gross area of guard, including any open areas, of which they are a part.

1.4 QUALITY ASSURANCE:

A. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.5 SUBMITTALS:

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit Engineered shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections, and structural calculations. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others. Shop drawings must be signed and sealed by a State of Florida registered engineer. Engineering shall comply the Florida Building Code 2020 and ASCE 7-16.

C. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Ferrous Metals:
1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Steel Plates, Shapes and Bars: ASTM A 36
3. Steel Bar Grating: ASTM A 569 or ASTM A 36
4. Steel Tubing: Cold-formed, ASTM A 500; or hot-rolled, ASTM A 501
5. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
6. Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
7. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
8. Gray Iron Castings: ASTM A 48, Class 30
9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
11. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

B. Aluminum Metals:
1. Aluminum Bar Gratings: ASTM B 221, alloy 6061-T6 or 6063-T6 for bearing bars, alloy 6061-T1 for cross bars
   a. Aluminum Rivets: ASTM B 316, alloy 6053-T4 or 6061-T6
2. Expanded Aluminum Grating: ASTM B 209, alloy 5052-H32
3. Fasteners for Aluminum Gratings: Use fasteners made of same basic metal as fastened metal except use galvanized fasteners complying with ASTM A 153 for exterior aluminum units, unless otherwise indicated. Do not use metals which are corrosive or incompatible with metals joined.

C. Grout:
1. Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C588, Type M.

2. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

D. Fasteners:

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A
3. Lag Bolts: Square head type, FS FF-B-561
4. Machine Screws: Cadmium plated steel, FS FF-S-92
5. Wood Screws: Flat head carbon steel, FS FF-S-111
6. Plain Washers: Round, carbon steel, FS FF-W-92
7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325
8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
9. Lock Washers: Helical spring type carbon steel, FS FF-W-84

E. Paint:
1. Shop Primer for Ferrous Metal: Manufacturer's or Fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.
2. Manufacturer: Carboline Carbo Zinc 11 HS Inorganic Zinc Primer

F. Concrete Fill:
1. Concrete Materials and Properties: Comply with requirements of Division-3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 3500 psi, 440 lbs. cement per cu. ft. minimum and W/C ratio of 0.65 maximum, unless higher strengths indicated.
2. Non-Slip aggregate Finish: Factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and non-glazing; unaffected by freezing, moisture or cleaning materials.

2.2 FABRICATION, GENERAL:

A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent- metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.

E. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

F. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

G. Galvanizing: Provide a zinc coating for those items indicated or specified to be galvanized, as follows:
   1. ASTM A 153 for galvanizing iron and steel hardware.
   2. ASTM A 123 for galvanized rolled, pressed and forged steel shapes, plates, bars and strips 1/8" thick and heavier.
   3. ASTM A 386 for galvanizing assembled steel products.

H. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

I. Shop Painting:
   1. Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
   2. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
      a. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning".
      b. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning:
   3. Manufacturer: Carboline Carbo Zinc 11 HS Inorganic Zinc Primer

2.3 ROUGH HARDWARE:

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items as specified in Division-6 sections.

B. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.4 LOOSE BEARING AND LEVELING PLATES:

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS:

A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricated from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

1. Except as otherwise indicated, space anchors 24" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

D. Galvanize exterior miscellaneous frames and supports where indicated on drawings. Provide shop applied primer at all other locations.

2.6 MISCELLANEOUS STEEL TRIM:

A. Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

B. Galvanize exterior miscellaneous steel trim where indicated on drawings. Provide shop applied primer at all other locations.

2.7 BAR GRATING LOUVERS:

A. Galvanized steel bar grating louvers shall be cut to span between steel roof beams and connected to steel angle welded to steel beams at both ends and to the inside of the bar grating.

2.8 SHELF ANGLES:

A. Provide structural steel shelf angles of sizes indicated for attachment to concrete framing. Provide slotted holes to receive 3/4" bolts, spaced not more than 6" from ends and not more than 24" o.c., unless otherwise indicated.

B. Furnish wedge-type concrete inserts, complete with fasteners, for attachment of shelf angles to cast-in-place concrete.

2.9 STEEL PIPE RAILINGS AND HANDRAILS:

A. Fabricate steel pipe railings and handrails to design, dimensions, and details, if applicable. Provide railings and handrails members formed of pipe of sizes and wall thickness indicated, but not less than that required to support design loading.

B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
1. At tee and cross intersections provide coped joints.
2. At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radii indicated.
3. At elbow bends provide mitered joints.
4. Form bends by use of prefabricated elbow fittings and radius bends or by bending pipe, at fabricator's option.

C. Form simple and compound curves by bending pipe to jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.

D. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.

E. Close exposed ends of pipe by welding 3/16" thick steel plat in place or by use of prefabricated fittings.

F. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use a 4: high x 1/8" plate welded to, and centered between, each railing post.

G. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railing and handrails to concrete or masonry work.
   1. For railing posts set in concrete provide sleeves of galvanized steel pipe not less than 6" long and with an inside diameter not less then 1/2" greater than the outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve.
   2. Provide friction fit, removable covers designed to keep sleeves clean and hold top edge of sleeve 1/2" below finished-surface of concrete.

2.10 CAST TREADS AND THRESHOLDS:

A. Fabricate units of material, sizes and configurations indicated. If not indicated, provide cast-iron units with integral abrasive finish. Furnish in lengths as required to accurately fit each opening or conditions.
   1. Stair nosings The base shall consist of heat treated extruded aluminum alloy 6063-T6. The abrasive filler shall consist of a mixture of aluminum oxide and silicon carbide granules in an epoxy matrix locked into the extruded channels of the base. The abrasive ribs shall project a minimum of 1/16 inch above the extruded channels. Nosings shall terminate not more than 3" from ends of steps for poured concrete stairs; for concrete filled steel pan stairs, nosings shall be full length of steps less 1/8" clearance.
   2. Color shall be as selected by the architect.

B. Manufacturer: Subject to compliance with requirements, provide cast treads and thresholds of one of the following:
   1. American Safety Tread Co. Type No. BF411D
      Helena, Alabama 35080.Telephone 1-800-245-4881.
      Amstep Products Type No. 200-241 A/AP
      190 Century Drive Bristol, Connecticut 06010. Telephone 800-457-0869
      Safe-T-Metal Co., Inc.
      P. O. Box 1182, Syracuse, NY 13201. Telephone (800) 886-7238

C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.

D. Drill for mechanical anchors with countersunk holes located not more than 4" from ends and not more than 12" o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.

E. Apply black asphaltic coating to concealed bottoms, sides, and edges of cast-iron units set into concrete.

F. Provide a plain surface texture, except where fluted or cross- hatched surfaces are indicated.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION:

A. General:
1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through- bolts, lag bolts, wood screws and other connectors as required.
2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
5. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
6. Set Loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.
7. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

B. Steel Pipe Railings and Handrails:
1. Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loading. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
    a. Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
    b. Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.
    c. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
    d. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.
2. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:

a. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
b. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
c. For hollow masonry anchorage, use toggle bolts having square heads.
d. For stud partitions use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.

3. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6" of posts.
4. Cast Treads and Thresholds: Install cast treads and thresholds with anchorage system indicated to comply with manufacturer's recommendations. Seal units exposed to exterior mastic to provide a watertight installation.

3.3 ADJUST AND CLEAN:

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

B. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

C. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 of these specifications.

D. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
   1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:
      a. Construction joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints between different materials listed above.
      d. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
      e. Control and expansion joints in ceilings and other overhead surfaces.
   2. Exterior joints in the following horizontal traffic surfaces:
      a. Isolation and contraction joints in cast-in-place concrete slabs.
      b. Tile control and expansion joints.
      c. Joints between different materials listed above.
   3. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints of exterior openings where indicated.
      c. Tile control and expansion joints.
      d. Vertical joints on exposed surfaces of concrete walls and partitions.
      e. Perimeter joints between interior wall surfaces and frames of doors, windows, louvers, and elevator entrances.
      f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   4. Interior joints in the following horizontal traffic surfaces:
      a. Isolation joints in cast-in-place concrete slabs.
      b. Control and expansion joints in tile flooring.

1.3 RELATED SECTIONS INCLUDE THE FOLLOWING:

A. Division 3 Section "Cast-in-Place Concrete" for joint sealants.

1.4 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates. Extent of each form and type of joint sealer is indicated on drawings.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this project and who will assign mechanics from these earlier applications to this project, of which one will serve as lead mechanic.

B. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

C. Pre-construction Joint Sealer-Substrate Tests: Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:
   1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.
   2. Testing will not be required when joint sealer manufacturer is able to submit joint preparation data required above which is acceptable to Architect and is based on previous testing of current sealant products for adhesion to, and compatibility with joint substrates matching those submitted.

1.6 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.

B. Samples for Initial Selection Purposes: Submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view.

C. Samples for Verification Purposes: Submit samples of each type and color of joint sealer required. Install joint sealer samples in 1/2" wide joints formed between two 6" long strips of material matching the appearance of exposed surfaces adjacent to joint sealers in the work.

D. Test Reports: Submit the following test reports:
   1. Preconstruction joint sealer-substrate test results including recommendations of joint sealer manufacturer for joint preparation and application of joint sealers applicable to project conditions.
   2. Certified test reports for elastomeric sealants evidencing compliance with requirements specified based on comprehensive testing of current product formulations within a 24-month period preceding date of submission of test reports to Architect. Include test results for aged performances including hardness, stain resistance, adhesion and cohesion under cyclic movement, low-temperature flexibility, modulus of elasticity at 100% strain, effects of heat aging, and effects of accelerated weathering.
   3. Certified test reports for joint sealers of type indicated below evidencing compliance with specified requirements:
      a. Foam-type filler-sealants
      b. Gaskets
      c. Pre-Compressed, Impregnated Foam Seal

E. Certificates: Submit certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

1.7 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.8 PROJECT CONDITIONS:

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:
   1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.
   2. When joint substrates are wet due to rain, condensation or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

1.9 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Three years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Ten years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
   1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with, and will adhered to, one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. Exterior Single-Component Urethane-Base Sealant:
   1. Products:
      a. Dymonic 100: ASTM C 920 Type S, Grade NS, Class 50, Use NT, T, M, A, O, I (Basis of Design).
      b. Dymonic FC: ASTM C 920 Type S, Grade NS, Class 35, Use NT, M, A and O
      c. Or Approved Equal
   2. Type and Grade: M (multi component) and NS (nonsag).
   3. Class: 50.

4. Federal Specifications TT-S-227 compliant
5. Provide primer and building paint on all exposed joints.

C. Interior Single-Component Acoustical Sealant:
1. Acoustical Sealant for Exposed and Concealed Joint: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
2. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
3. Products:
   a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
   b. Tremco Corporation; Tremflex 834 Siliconized Interior Latex Sealant
   c. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
   d. Or Approved Equal

D. All sealants shall be delivered to the job site in sealed containers bearing the manufacturer's name, mixed, stored, handled and applied in strict accordance with the manufacturer's detailed printed specifications, recommendations and instructions, copies of which shall be submitted with samples for approval and made available to the Architect at all times on the job site.

E. Manufacturer's label shall indicate the date of manufacture of sealants, or manufacturer shall otherwise attest to the date of manufacture. The period of time lapsed for polysulfide shall be not longer than six (6) months, and three (3) months for polyurethane, from the date of manufacture to the date of usage on the job.

F. Primers, where required, shall be as recommended by the sealant manufacturer.

G. The color of the sealants shall be as selected by the Architect from the manufacturer's standard range of colors. Color for polyuria sealant shall be custom matched to floor polish and dye color.

H. Bond-breakers where required shall be as recommended by the sealant manufacturer in writing to the Architect.

I. Slab Joint filler material in back of the sealants shall be a closed cell polyethylene conforming to the requirements specified hereinafter.

1. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

2. Joint Filler: Preformed Expansion Joint Filler or Slab Isolation Joint Filler with typical thickness 1/2, 3/4, or 1 inch and height equal to slab thickness with a removable top section for creation of a sealant void.
   a. Materials: Provide a semi-rigid, closed-cell polypropylene foam, preformed joint filler that fully complies with ASTM D8139. NOMAFLEX® by Nomaco, Inc.
   b. Manufacturers: Nomaco, Inc., 501 Innovative Way, Zebulon, NC 27597. Phone (877) 291-1157. Fax (919) 269-7936. Website: https://www.nomaco.com/product/nomaflex/

J. Traffic Rated Joints: (Subject to Vehicular or Pedestrian Traffic) Sealant at traffic joints shall be two-part Silicone-base sealant of self-leveling consistency, meeting the following standards:
1. Products:
   a. Pecora Corporation; Pecora 322FC Fast Cure Traffic Rated Sealant.
   b. Or approved equal
2. Weatherability - This sealant’s 100% silicone composition is virtually unaffected by UV, Precipitation, ozone, and temperature extremes.
3. Sealant shall remain flexible under extreme temperature swings (-49° to 300°F).

4. Fast Curing - Fast cure profile allows quick job site turnaround. Early movement shall not affect sealant performance.
5. Self-leveling - No tooling required when applied through typical static mixing equipment.
6. Auto-bonding - Will bond to itself tenaciously without the need for priming.
7. Minimum Performance as listed below:

ASTM D 412	EB, %	1400
ASTM D 412	TB	50
ASTM C 1135	25M, psi	5
	50M, psi	12
	150M, psi	15
ASTM C 1135	EB, %	>600
ASTM C 719	% Movement	+100/-50
ASTM D 2240	Shore 00	55

PART 3 - EXECUTION

3.1 INSPECTION:

A. Require Installer to inspect joints indicated to receive joint sealers for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Obtain Installer's written report listing any conditions detrimental to performance of joint sealer work. Do not allow joint sealer work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Pre-Installation Meeting: At Contractor's direction, Installer, joint sealer manufacturers' representatives, and other trades whose work affects installation of joint sealers shall meet at project site to review procedures and time schedule proposed for installation of joint sealers which is coordinated with other, related work.

B. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:
   1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer, oil, grease, waterproofing, water repellents, water, surface dirt and frost.
   2. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, acid washing or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
   3. Remove laitance and form release agents from concrete.
   4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile and other non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

C. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond; do not allow spillage or migration onto adjoining surfaces.

D. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALERS:

A. General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Solvent-Release-Curing Sealant Installation Standard: Comply with requirements of ASTM C 804 for use of solvent-release-curing sealants.

D. Latex Sealant Installation Standard: Comply with requirements of ASTM C 790 for use of latex sealants.

E. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.

F. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
   1. Install joint-fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
      a. Do not leave gaps between ends of joint-fillers.
      b. Do not stretch, twist, puncture or tear joint-fillers.
      c. Remove absorbent joint-fillers which have become wet prior to sealant application and replace with dry material.
   2. Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where required to prevent third-side adhesion of sealant to back of joint.
   3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

G. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

H. Tooling of Non-Sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
   1. Concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.
   2. Flush joint configuration per Figure 6B in ASTM C 962, where indicated.
   3. Use masking tape to protect adjacent surfaces of recessed tooled joints.
   4. Recessed joint configuration per Figure 6C in ASTM C 962, of recess depth and at locations indicated.

I. Installation of Pre-Formed Hollow Neoprene Gaskets: Install gaskets, with minimum number of end joints, in joint recesses with edges free of spalls and sides straight and parallel, both within tolerances specified by gasket manufacturer. Apply manufacturer's recommended adhesive to joint substrates immediately prior to installing gaskets. For straight sections provide gaskets in continuous lengths; where changes in direction occur, adhesively splice gasket together to provide watertight joint. Recess gasket below adjoining joint surfaces by 1/8" to 1/4".

J. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs.

3.4 PROTECTION AND CLEANING:

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF WORK:

A. Extent of painting work is indicated on drawings and schedules, and as herein specified. See Finish Schedule Legend.

B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.

C. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

E. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.

F. Following categories of work are not included as part of field-applied finish work:

G. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, aluminum windows, and finished mechanical and electrical equipment, including light fixtures, switch gear and distribution cabinets.

H. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceiling in concealed areas and generally inaccessible areas.

I. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.

J. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts will not require finishing painting.

K. Following categories of work are included under other sections of these specifications:

L. Shop Priming: Shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.

M. Do not paint over and code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.

1.3 QUALITY ASSURANCE:

A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coating system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

C. Standards: All field applied coatings and finishes shall comply with Green Seal Zero VOC or Low VOC standards. Maximum allowable VOC content for finishes is as follows:

1. Interior flat finish: 50 g/l (0.42 lbs/gal)
2. Interior non-flat finish: 150 g/l (1.25 lbs/gal)
3. Exterior flat finish: 100 g/l (0.83 lbs/gal)
4. Exterior non-flat finish: 200 g/l (1.66 lbs/gal)

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use. Acceptable manufacturers shall be Sherwin Williams, Benjamin Moore

B. Green Label Certification – submit manufacturer's certification information stating compliance with Zero VOC or Low VOC standard for all products, including paints, primers, sealers, block-fillers, stains, etc.

C. Samples: Prior to beginning work, Architect will identify colors for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample. Provide three (3) samples of each color.

D. On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

E. Final acceptance of colors will be from samples applied on the job.

1.5 DELIVERY AND STORAGE:

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label and following information:

1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's name.
5. Contents by volume, for major pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.

8. Color name and number.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

C. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.6 JOB CONDITIONS:

A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C) and 95 degrees F (35 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

1.7 EXTRA MATERIAL:

A. Provide extra stock of each paint color/finish: An amount sufficient to cover 5% of the total surface area for each color and finish, but not less than one gallon.

1.8 WARRANTY:

A. Provide Five (5) year warranty for exterior waterproofing system from Paint and Coating manufacturer.
B. Provide Five (5) year warranty for all other systems from Paint and Coating manufacturers.

PART 2 - PRODUCTS

STANDARD OF COMPARISON - Materials and methods specified are for the clarity of description and as a standard of comparison and are those of Sherwin Williams.

2.1 REQUIREMENTS:

A. Paint Manufacturer: Subject to compliance with requirements, provide the following:

1. Exterior - Sherwin Williams 'Loxon' XP waterproof coating – Flat, satin, gloss
2. Exterior Primer - Sherwin Williams 'Loxon' – heavy duty primer / sealer
3. Metals: Sherwin Williams 'Acrolon 100' – heavy duty Polyurethane
4. Metals Primer - Sherwin Williams 'Pro-Cryl' – Universal heavy duty primer
5. Ferrous Metals: See Section 09960 Protective Coatings

Any galvanized metal to be painted should be solvent cleaned per SSPC-SP1, with a non-hydrocarbon based solvent, then primed, as specified. If surface has significant rust, then prepare per SSPC-SP2, then clean and prime as above. Topcoat after following label directions for drying times, etc, at specified coating thickness. Never apply an alkyd-based product directly to galvanized steel.

6.) Any aluminum surfaces to be painted shall be cleaned as above and also solvent cleaned per SSPC-SP1. Before topcoating wipe clean with lacquer thinner and allow to dry prior to topcoating. Do not use mineral sprits or other hydrocarbon based solvents.

B. Color and finish as selected by Owner and Architect.

2.2 CAULKING.

All perimeter joints around windows and doors are to be carefully caulked using Sherwin-Williams Stampede Urethane Sealant Caulking according to the manufactures recommendations. Interior caulking shall be Power House 65 year Siliconized Acrylic caulk and shall be applied at the direction of the Contractor tool after application. Caulk all voids and horizontal bands.

2.3 MATERIALS:

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade, Low or no VOC product will not be acceptable.

B. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

C. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.

B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

D. Test moisture content of surfaces using an electronic moisture meter. Do not begin application of coatings unless moisture content of exposed surfaces is below the following maximum values:
1. Wood Surfaces: 15 percent.

3.2 SURFACE PREPARATION:

A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

B. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

C. Remove hardware, hardware accessories, machined surfaces, plates, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

D. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

E. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, and cement plaster to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

F. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

G. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

H. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION:

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.4 FIELD SAMPLE APPROVAL:

A. On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work. Shades for each coat shall be distinguishable for each paint sample.

B. Final acceptance of colors will be from samples applied on the job.

C. DO NOT proceed with painting throughout the building without in field sample approval.

3.5 PAINT APPLICATION:

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Paint colors are indicated in "schedules" of the contract documents.

C. Provide finish coats which are compatible with prime paints used. Apply additional coats when undercoats or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

D. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

E. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

F. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

G. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

H. Sand lightly between each succeeding enamel coat.

I. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

J. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

K. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

L. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated as recommended by coating manufacturer.

M. Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.

N. Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

O. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth, 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.

P. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.6 FIELD QUALITY CONTROL:

A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting.

B. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.

C. Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, re-coating, skinning, color retention, alkali resistance, and quantitative materials analysis.

D. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

E. Prime coat color shall be (3) shades lower than the final finish color. Mid coat paint color shall be (1) shade lower that the final finish color. Final finish coat shall be the actual color specified in the construction documents. Provide sufficient coverage with each successive coat to fully cover the previous coat until a uniform finish is achieved.

3.7 CLEAN-UP AND PROTECTION:

A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

C. Provide “Wet Paint” signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

D. At completion of work of other trades, touch-up and restore all damaged or defaced surfaces.

3.8 EXTERIOR PAINT SCHEDULE:

A. General: Provide the following paint systems for the various substrates, as indicated (or approved equal).

B. Concrete and Stucco:
   1. Satin Finish (10 - 20 Units @ 85°):
      a. 1st Coat: Sherwin Williams ‘Loxon’ – heavy duty primer / sealer
      b. 2nd Coat: ULTRA-CRETE Texture Coating Medium
      c. 3rd Coat: Sherwin Williams ‘Loxon’ XP waterproof coating
      d. 4th Coat: Sherwin Williams ‘Loxon’ XP waterproof coating

C. Ferrous Metal, Primed Metal, Zinc-Coated Metal, and Aluminum (heavy duty):
   1. See section 09960 - Protective Coatings

END OF SECTION

SECTION 09960 - PROTECTIVE COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Protective coatings and surface preparation for the following coating systems:
   1. Exposed atmospheric high performance coating systems.

1.2 SCOPE

A. All Exposed Steel Framing, Deck, Beams and Columns shall be prepared and coated per the products specified.

B. General Exposed Exterior or Surfaces to be Painted:
   1. Structural steel.

C. General Exposed Interior Surfaces to be Painted:
   1. Structural steel.

D. General Surfaces Not to be Painted:
   1. Concrete, unless required by the drawings.
   2. Electrical panels when not adjacent to a painted surface.
   3. Equipment nameplates.
   4. Glass.
   5. Grease fittings.
   6. Machined surfaces.
   7. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.
   8. Stainless steel items.
   9. Fiberglass surfaces in immersion.
   10. Prefinished metal such as Kynar coated.

1.3 DEFINITIONS

A. Definitions:
   1. Contractor is the party or persons directly contracted or subcontracted through a third party to perform the work described herein.
   2. Architect is the supervising Architect of record.
   3. Owner is the facility Owner.
   4. Manufacturer is the materials supplier.

B. Substrate Identification:
   1. AL: Aluminum.
   2. C: Concrete.
   3. CMU: Concrete Masonry Units.
   4. CO: Copper.
   5. CS: Carbon Steel.
   6. F: Fiberglass.
   7. G: Gypsum Board.
   8. GAL: Galvanized Metal.
   9. PP: Previously Painted.
   10. S: Stainless Steel.
   11. W: Wood.

C. Service Condition Identification:
1. A: Atmospheric: Any metal or concrete surface, indoors or outdoors that is exposed to view.
2. C: Corrosive: pH range 5 to 9: Atmospheric exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, solutions incidental contact splash on walls or solutions Submerged conditions where the pH is 5 to 9 and H2S exposure is medium to low.
3. F: Fumes: Gas, Smoke, or Vapor, irritating, or offensive.
4. HC: High Corrosive: pH range below 4 or above 10: Atmospheric exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, solutions incidental contact splash on walls or solutions Submerged conditions where the pH is 5 to 9 and H2S exposure is high.
5. HFT: Heavy Forklift Traffic Floor: Horizontal concrete surface subject to point loads above 6,000 lbs (2721.5 kg). typically related to hard tire forklift activity.
6. HT: High Temperature: Continuous non immersion temperature where the substrate temperature is above 250 F (121 C).
7. IC: Immersion Continuous: Substrate will be continually immersed in aqueous solution, including corrosive, high corrosive, or non-corrosive solutions, liquids, water or other mixtures.
8. LFT: Light Foot Traffic Floor: Horizontal concrete surface subject to point loads below 5,000 pounds (2268 kg). Normally associated with pedestrian traffic with hand carts or trucks.
9. NC: Non Corrosive: Atmospheric or submerged exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture or solutions where the associated exposures are relatively neutral or benign.
10. ND: Normally Dry: Substrate is exposed to moisture from environmental conditions but remains dry more than 85 percent of its service life.
11. NW: Normally Wet: Substrate is exposed to moisture from environmental conditions and remains moist not less than 85 percent of its service life.
12. PW: Potable Water: Water suitable for human consumption as defined by ANSI 61.
13. S: Submerged: Substrate is continually immersed in an aqueous solution.
14. SC: Secondary Containment, 72 Hour Immersion: Substrate will be continually immersed for 72 hours in a chemical solution as associated with EPA containment requirements.
15. SP: Splash and Spill: Substrate is frequently subjected to exposure to aqueous solutions, but is generally cleaned up within 2-8 hours
16. UV: Ultraviolet: Substrate is exposed to ultraviolet sunlight.

1.4 REFERENCES

A. ASTM International (ASTM):
1. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
2. ASTM D 4258, Standard Practice for Surface Cleaning Concrete for Coating.
3. ASTM D 4259, Standard Practice for Abrading Concrete.
4. ASTM D 4261, Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating.
5. ASTM D 4262, Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
6. ASTM D 4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
7. ASTM D 4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel.
8. ASTM D 4541, Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
9. ASTM D 7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals.

B. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

C. International Concrete Repair Institute (ICRI):
1. 310.2 - Surface Preparation for Concrete.
2. CSP - Concrete Surface Profile.

D. NACE International (NACE):
   1. SP0188-06 - Discontinuity (Holiday) Testing of Protective Coatings.

E. The Society for Protective Coatings (SSPC):
   1. SSPC-SP 1 - Solvent Cleaning.
   2. SSPC-SP 2 - Hand Tool Cleaning.
   3. SSPC-SP 3 - Power Tool Cleaning.
   4. SSPC-SP 5 / NACE 1 - White Metal Blast Cleaning.
   5. SSPC-SP 6 / NACE 3 - Commercial Blast Cleaning.
   6. SSPC-SP 7 - Brush off Blast Cleaning.
   7. SSPC-SP 10 / NACE 2 - Near White Metal Blast Cleaning.
   8. SSPC-SP 11 - Machine Tool Cleaning to Bare Metal.
   9. SPSC-SP 12 / NACE 5 - Waterjet Cleaning.
   10. SSPC-SP 13 / NACE 6 - Surface Preparation for Concrete.
   11. SSPC-SP 14 / NACE 8 - Industrial Blast Cleaning.
   12. SSPC-SP 15 - Commercial Grade Power Tool Cleaning.
   13. SSPC-SP 16 - Brush off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non Ferrous Metals.
   14. SSPC-SP WJ-1 / NACE WJ-1 Clean to Bare Substrate.
   15. SSPC-SP WJ-2 / NACE WJ-2 Very Thorough Cleaning.
   16. SSPC-SP WJ-3 / NACE WJ-3 Thorough Cleaning.
   17. SSPC-SP WJ-4 / NACE WJ-4 Light Cleaning.
   18. SSPC-PA1 - Best Practices for Paints and Coatings Application.
   19. SSPC-PA2 - Measurement of Dry Coating Thickness with Magnetic Gauges.
   20. SSPC-PA71 - Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements.

F. United States Environmental Protection Agency (EPA):
   1. Method 24 - Surface Coatings.

1.5 QUALIFICATIONS

A. Coating manufacturer's authorized representative shall provide written statement attesting that the applicator has been instructed on proper preparation, mixing and application procedures for coatings specified.

B. Applicators shall have a minimum of 5 years' experience in application of similar products on similar project.
   1. Contractor shall possess a valid state license as required for performance of the painting and coating work called for in this specification.
   2. Provide references for minimum of three different projects completed in last five years with similar scope of work.
      a. Include name and address of project, size, and scope of work.

C. Applicators shall possess current SSPC-QP certifications as required by the Owner and Architect.

1.6 SUBMITTALS

A. Submit all required documentation noted herein and under provisions of Section 01330, Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each paint and coating product should include:
   1. Colors available for each product (where applicable).
   2. Product characteristics and coating manufacturer's guidelines and recommendations for surface preparation, painting, drying, curing, handling, shipping, and storage of painted structural steel.
   3. Surface preparation requirements.
   4. Storage and handling requirements and recommendations.

5. Application methods.
6. VOC compliance.
7. MSDS.

C. Contractor Work Plan:
1. In general, the contractor shall supply the Owner or Architect's representative with a plan of work. The work plan should detail but is not limited to the following items.
2. Proposed methods of containment, collection, and disposal of related debris, rinse water, or trash.
3. Proposed surface preparation standards and methods to achieve standard for each space or substrate identified on the plans, drawings, or finish schedule.
4. Proposed coating system for each space or substrate identified on the plans, drawings, or finish schedule.
5. Confirmation of compatibility for shop and field applied coatings. (where applicable).
6. Proposed methods and equipment to be used for paint application.
7. Proposed methods for maintaining proper environmental conditions during surface preparation, application, and curing cycles of the coating materials.
8. Proposed methods and job safety analysis procedures for maintaining a clean, safe and secure jobsite during work activity.
9. Proposed methods to protect coating during curing, shipping, handling, and storage.
10. Proposed methods for storing materials.
11. Proposed methods and examples of daily reports of contractor work progress.
12. Potential hazards and mitigation, work processes, scheduling conflicts or other planning items which would hinder successful and timely completion of the project.

D. Selection Samples: Submit a complete set of color chips that represent the full range of manufactures color samples available.

E. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

1.7 QUALITY ASSURANCE

A. Quality assurance procedures and practices shall be at the discretion of the Architect or Owner. It provides oversight of quality control monitoring of all phases of the installation process including but not limited to surface preparation and application of coatings.
1. Requirements for acceptable quality control methods shall be utilized and defined by the Owner or Architect.
2. Procedures or practices for quality control practices not specifically defined in this Section may be utilized, provided they meet recognized and acceptable professional standards and are accepted by the Architect or Owner's representative.
3. Arrange for coating manufacturer's representative to attend preconstruction conferences and make periodic visits at the construction site to provide consultation services during surface preparation work and application of coatings.
4. Quality assurance activities may be performed by a third party inspection firm contracted by the Owner or specifying Architect on their behalf at any time during the project.

B. Pre-Installation Conference:
1. The contractor, the installation sub-contractor, and the lining system manufacturer's representative shall meet on site with the Owner's representative. Particular emphasis shall be placed on these specification requirements, safety, weather conditions, surface preparation, material application, and inspection.
2. The contractor shall submit to the Owner's representative any revisions or changes agreed upon, reasons thereof, and parties agreeing or disagreeing with them.

C. Surface Preparation: Preparation of all surfaces and application of coatings specified in this section shall be in strict accordance with coating manufacturer's instructions as supplemented by these

specifications.

D. Coating Application: Apply coatings in strict accordance with manufacturer's material data sheets with particular attention to curing and drying times and temperatures.
   1. Substrate Conditions: Do not proceed with immersion, submerged, industrial resinous flooring, and chemical containment work until substrate preparation and tolerances have been approved by the Owner's representative, chemical resistant system manufacturer's representative, the approved installation sub-contractor, and the contractor.

E. Inspection of Dry Film: Thickness of coatings shall be checked with a nondestructive, magnetic-type thickness gauge.
   1. Ensure all dry film thickness requirements as specified have been met. Readings shall be performed at or above the frequency specified in SSPC-PA2. Meet the minimum requirements for SSPC-PA2.
   2. Use an instrument such as a Tooke Gauge if a destructive tester is deemed necessary.
   3. Test coating integrity of all surfaces with an approved inspection device.
   4. No pinholes or other irregularities will be permitted in final coating.

F. Inspection Testing Devices: Provide following testing devices to be jointly used on this project by the contractor and Architect. Devices shall remain property of contractor during and after project.
   1. Surface profile Comparator or Testex Tape to measure surface profile prior to coating application.
   2. Psychrometer and psychometric tables or charts for humidity and dew point determination.
   3. Dry film thickness gauge and calibration blocks for coating thickness testing.
   4. Wet film thickness gauge for coating thickness testing.
   5. 10 times magnifier for examination.

G. Documentation: Provide daily reports of all contractor activity on site to the Architect on the Friday, end of work week, for the previous week activity.
   1. Document sample shall be approved by the Architect prior to reporting.
   2. All documentation shall be delivered electronically to the Architect upon completion of the project.
   3. Documentation should be consistent with inspection reports utilized by NACE certified inspectors.

H. Samples: Prior to beginning work, Architect will identify colors for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect’s review of color and texture only. Provide a listing of material and application for each coat of each finish sample. Provide three (3) samples of each color.

I. On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

J. Final acceptance of colors will be from samples applied on the job.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufactures name, label, and the following list of information:
   1. Product name, type (description).
   2. Application and use instructions.
   3. Surface preparation.
   4. VOC content: for two component products, provide mixed VOC in g/L.
   5. Environmental issues.
   6. Batch date.

7. Color number.

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
   1. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

C. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions during surface preparation, application, and curing of installed coating system.
   1. Temperature, humidity, and ventilation must be within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

B. Substrate moisture content shall be below manufacturer's recommendation for each substrate to be coated.

1.10 EXTRA MATERIAL:

A. Provide extra stock of each paint color/finish: An amount sufficient to cover 5% of the total surface area for each color, but not less than one gallon.

1.11 WARRANTY:

A. Provide a Five (5) year warranty for protective coating system from the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Sherwin-Williams, 101 Prospect Ave.; Cleveland, OH 44115; Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989

B. To establish equality under Section 01600 - Products, Materials, Equipment and Substitutions the contractor shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "equal" product that the material meets the indicated requirements and is equivalent or better in the following properties.
   1. Quality.
   2. Durability.
   3. Resistance to abrasion, impact, or physical damage.
   4. Life expectancy.
   5. Ability to recoat in the future.
   6. Solids content by volume.
   7. Dry film thickness per coat.
   8. Compatibility with other coatings.
   9. Suitability for the intended service.
   10. Resistance to chemical attack.
   11. Temperature limitations during application and in service
   12. Comparable performance test results.

C. Protective coating materials shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions.

When requested, the contractor shall provide the Architect with the names of not less than ten successful applications of the proposed manufacturer's products that comply with these requirements.

D. Standard approved painting, coating, and lining systems are defined herein. Apply approved systems according to the finish schedule.

2.2 EXPOSED ATMOSPHERIC HIGH PERFORMANCE COATING SYSTEMS

A. Industrial Epoxy, Epoxy Finish (S/G):
   1. Minimum total film thickness, 8.0 mils dft.
   2. Spot prime all exposed substrates with the designated new substrate primer.
   3. Prime:
      a. Ferrous Metal, Minimum 5.0 mils dft: MACROPOXY 646, B58-600 Series. See drawings for more information
      b. Previously Painted, Minimum 3 mils dft: MACROPOXY 646, B58-600 Series.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine all substrates and conditions, with contractor representative present for compliance with requirements for maximum moisture content, surface soundness, and other conditions affecting the performance of the Work.

B. Do not begin application of coatings until substrates have been properly prepared, examined, and conditions properly reported. Notify Architect of unsatisfactory conditions or areas where specified surface preparation cannot be achieved.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation. Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions. Beginning coating application constitutes contractors acceptance of substrate and conditions.

D. Identify all shop primed items and previously painted surfaces and provide preparation procedures for review and approval.

3.2 SURFACE PREPARATION:

A. General:
   1. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
      a. Remove incompatible primers and prime substrate with compatible primers or apply a tie coat as required to product the coating system indicated.
      b. Previously coated, existing surfaces shall be identified and existing coating type confirmed. In the event that the existing coating cannot be confirmed consult with the manufacturer and submit tie coat alternative solutions.
   2. Follow all surface preparation guidelines for new construction. In the event of a discrepancy consider the more effective surface preparation as the default method.
   3. Verify that the atmospheric conditions are within the acceptable temperature, humidity and sun exposure limits.
      a. Dehumidification must be utilized in the event that atmospheric conditions cannot be maintained.
   4. Adhere to manufacturer's recoat time surface preparation requirements.
      a. Surfaces exhibiting rust bloom, moisture weeping, or any other deleterious condition shall be sufficient repaired prior to the application of coating or lining system. Repair methods include necessary mean to meet original specification requirements, including

abrasive blasting as needed.

5. Remove any residual dusting or light surface contamination from prepared surfaces prior to the application of the coating system.
6. Protect all surfaces not being coated from any damage due to surface preparation work process.
7. Paint all inaccessible items before being assembled.
8. Install coating systems to only properly prepared surfaces.

B. Existing or Previously Coated Surface Preparation:

1. Clean all previously coated surfaces to remove dirt, greases, solutions, and any foreign contaminants per SSPC-SP1. Cleaning agent shall be biodegradable, highly concentrated, water reducible, alkaline detergent blend. Cleaned surfaces shall be properly rinsed to remove all cleaners and contaminants.
2. Previously coated, existing painted surfaces shall be thoroughly and completely abraded. Existing coatings shall be sufficiently deglossed and profiled for application of prime coats.
3. Exposed or corroded substrates shall be mechanically cleaned to SSPC-SP-3 “Power Tool Cleaning” in order to remove all corrosion or deteriorated material. Sand and feather edge a smooth transition from existing coatings and exposed substrate such that damaged area are not visible from a distance of two (2) feet.
4. Final surface preparation for existing coatings and deteriorated substrates shall provide intact, tightly adherent coatings, cleaned substrate, dull, and dry.

3.3 INSTALLATION

A. General Requirements:

1. Apply all coatings and materials according to the finish schedule.
2. Apply all coatings and materials with manufacture specifications in mind. Apply coatings by brush, roller, or spray equipment unless otherwise directed by the manufacturer.
3. Mix and thin coatings according to manufacture recommendation.
4. Do not apply to wet or damp surfaces.
5. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen in accordance with SSPC-PA1.Regardless of number of coats specified, apply as many coats as necessary for complete hide, uniform appearance, and achieving the required dry film thickness. Final film of coatings shall have no visible, drips, overspray, dry spray, runs, ridges, sags, holidays, dry lap or brush marks.
6. Inspection: The coated surface must be inspected and approved by the Architect or Architect.
7. Stripe coats shall be applied to all welds, edges, nuts, bolts, difficult to reach areas.
    a. Stripe coats shall be applied directly to properly prepared surface prior to spray application of primers.
    b. Stripe coats shall also be applied directly to primed surface prior to spray application of the intermediate coats for multi-coat immersion or submerged applications.
    c. Stripe coat material shall be the same or separately approved material compatible with the material used for spray application of any given coat.
8. Spray application shall be performed when conditions, environments, and permitting allow.
    a. Use only spray equipment approved by the manufacturer for the specific coat of material.
9. Multiple coat applications shall be installed according to the manufacturers printed requirements.
    a. Coats of material shall be sufficiently dry prior to the application of a subsequent coat in a coating system.
    b. Do not allow excessive drying time to pass which will inhibit or reduce the inter-coat adhesion of the multiple coat system.
    c. If recoat requirements have been exceeded, brush blast or scarify prior coat according to the manufacturers requirement. Provide written confirmation of repair process from manufacturer.
    d. Remove any dust or foreign contamination from previous coat prior to applying the next coat in a multi coat system.
10. Apply no coating when surrounding air temperature of surface to be coated is below minimum temperature allowed by manufacturer's recommendations for coating application or when it is

expected that air temperature will drop below minimum 8 hours after coating application.

11. Apply no coating when surrounding air temperature is forecasted to be less than 5 degrees F (C) above dew point within 8 hours after coating application.
12. Apply no coating to steel which is 5 degrees F (C) below air temperature or which is at a temperature over 115 degrees F (C), nor shall coating be applied to steel which is at a temperature that will cause blistering or porosity or otherwise will be detrimental to the life of the coating.
13. No coating shall be applied to wet or damp surfaces or in rain, snow, fog, or mist. Coating shall not be applied on frosted or ice-coated surfaces.
14. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables or equivalent.
15. The coated surface must be inspected after application of individual coats within the multi coat system and after completion of the system. Applied systems must be approved by the Architect or Architect.

B. Curing Requirements:
   1. Maintain adequate environmental conditions and ventilation during drying and curing of applied coating systems.
   2. Allow all primer and intermediate coats to sufficiently dry prior to the application of subsequent coat of material.
   3. Coating systems to be placed into immersion service shall cure under the proper conditions as stated by the manufacturer for the full curing time requirement. Deviations from the proper conditions shall be quickly resolved by the contractor and the methods used shall be confirmed by the manufacturer.
   4. All applied coatings shall be properly and completely cured prior to being place into their intended service.

C. Shop Application:
   1. All structural steel members, steel plate, or other manufactured items may be prepared and coated in a fixed location.
   2. Shop application of prime coat shall be completed only when specified surface preparation has been achieve for the substrate. Apply all primers within 4 hours of completion of surface preparation. Ferrous metal shall not be primed if rust bloom is present.
   3. Field repair any damaged shop primer, intermediate or finish coats in accordance with the preparation requirements for the given substrate. Apply repair primer, intermediate, and finish coats as required to replace damage materials and restore damaged areas equal to surface before damage.
   4. Equipment:
      a. Unless otherwise indicated, items of equipment or parts of equipment which are not submerged in service shall be shop primed and the finish coated in the field after installation with the indicated or selected color. The methods, materials, application equipment, and other details of shop painting shall comply with this section. If the shop primer requires top coating within in a specific period of time, the equipment shall be finish coated in the shop and then touched up after installation.
      b. Items of equipment or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves, shall have surface preparation and coating performed in the field.
      c. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switchgear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the indicated quality in the field. Such equipment shall be primed and finish-coated in the shop and touched up in the field with the identical material after installation. The contractor shall require the manufacturer of each such piece of equipment to certify as part of its Shop Drawings that the surface preparation is in accordance with these

specifications. The coating material data sheet shall be submitted with the Shop Drawings for the equipment.

d. For certain small pieces of equipment the manufacturer may have a standard coating system that is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the Shop Drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

e. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before being top coated or less time if recommended by the coating manufacturer.

D. Prime Coat Application:
1. Prime all surfaces to be painted.
2. Prime and finish all surfaces that will be inaccessible after installation.
3. Back prime all wood substrates with two coats of approved primer prior to installation.
4. Primed substrate shall be of consistent film thickness and coverage to meet the specification.
5. Provide proper environmental conditions for curing of prime coat.

E. Finish Coat Application:
1. Apply all intermediate and finish coats to properly primed substrates within the recoat requirements and according to the product data sheet of the manufacturer.
2. Apply contrasting colors for distinguishing between intermediate and finish coats.
3. Field applied intermediate and finish coats shall be applied to shop primed substrates only within sufficient adhesion can be obtained. When required, thoroughly and completely abrade existing primers and apply a subsequent tie coat of approved primer will be applied to the abraded shop primer.

3.4 QUALITY CONTROL

A. In general the contractor will maintain appropriate and measurable quality control activities that ensure successful installation of the coating systems.

B. Measure all dry film thickness readings as defined in SSPC-PA2.

C. Apply all coatings using methods defined in SSPC-PA1.

D. Perform all stripe coating using methods defined in SSPC-PA 11.

E. Maintain and provide to Architect copies of daily records of contractor activity while performing work on the project. Daily record information should include but is not limited to the following.
1. Site foreman responsible for day's activities.
2. Work hours. Start and finish times.
3. Crew members.
4. Atmospheric measurements during exterior work should include evenly sequenced measurements of general weather condition, wind speed, air temperature, and relative humidity.
5. Atmospheric measurements during high performance coating application particularly submerged or immersion items should include evenly sequenced measurements of general weather condition, wind speed, air temperature, and relative humidity during all surface preparation, application, and curing of applied systems.
6. Substrate temperatures at the time of application and completion of the application.
7. Measure wet film of applied coating using wet film thickness gauges.
8. Detailed record of start and finish times of activities performed on a given space.

F. Maintain accurate quality control records of applied coating systems.
1. Record accurate dry film thickness readings in accordance with SSPC-PA 2.

G. Supply daily reports on a timely basis to the supervising Architect.

3.5 PROTECTION

A. Protect finished coatings from damage until completion of project.
   1. Applied coatings shall not be placed into service until properly cured.
   2. Maintain acceptable environmental conditions for proper curing of the applied coating system.

B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION