FORMAL BID PROPOSAL AND
CONTRACT DOCUMENTS FOR

Jacksonville Station Re-Bid

Bid No. FY 20-07A



CITY COUNCIL MEMBERS

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RICHARD L. WOODRUFF, CITY MANAGER

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Addendum #3 incorporated into Jacksonville Station Re-Bid

ADDENDUM NO. THREE

2 MARCH 2020

PROJECT TITLE: **JACKSONVILLE STATION**
1300 NORTH MARINE BOULEVARD/HWY 17 NORTH
JACKSONVILLE, NORTH CAROLINA
JACKSONVILLE PROJECT NO. BP19-00002283
HRA COMMISSION #189518.00

ADDENDUM:

I. Contents of this addendum are to be part of the overall Bid Documents.

BID DATE:

I. Project Bid Date: **11 AM WEDNESDAY, 11 MARCH 2020**

DRAWINGS/SPECIFICATION:

Drawings:

1. Site/Civil:
   CAD file related to the site grading can be obtained from the Civil engineer upon execution of the attached release form. The form needs to be returned to Deanna Trebil with the City of Jacksonville and John W. Farabow Jr AIA via one of the General Contractor bidders.

Specifications:

1. Series 0 Section 00810 Supplementary Conditions as provided by City of Jacksonville:
   a. Remove Section 00810 Supplementary Conditions and replace with attached revised Section 00810 Supplementary Conditions.
2. Section 04810 Unit Masonry Assemblies:
   a. Part 2 – Products Paragraph Section 2.4.2.
   Change Type FBX to Type FBS.

John W. Farabow Jr. AIA NCARB
Project Architect



00810 SUPPLEMENTARY CONDITIONS

SCOPE

These Supplementary Conditions amend or supplement the General Conditions. All provisions of the General Conditions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to the singular and plural thereof.

SC-1.01.A.24 Amend Paragraph 1.01.A.24 to read as follows:

Any and all applicable laws, rules, and regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts will be construed pursuant to the laws of the State of North Carolina. All claims and disputes arising from any contract shall be construed pursuant to the laws of the State of North Carolina. The State of North Carolina is the proper jurisdiction for all claims and disputes arising under any contract and the proper venue is the Onslow County Superior Court.

SC-4.02 Add a new Paragraph immediately after Paragraph 4.02.B which is to read as follows:

SC-4.02.C In the preparation of the Drawings and Specifications, Engineer has relied upon:

1. The following report of explorations and tests of subsurface conditions at the Site.
   a. Geotechnical Engineering Report by ECS Southeast, LLP for Jacksonville Transit dated June 10, 2019.
   b. The technical data contained in such report upon which Contractor may rely are: the boring method, the locations and logs of the borings, the levels of subsurface water (if any), laboratory test methods and results, and similar factual data. Bore hole information represents subsurface characteristics to the extent indicated, only for the point location of the bore hole and, with regard to the level of subsurface water (if any), only at the time the boring was made. Contractor shall make its own interpretations of the subsurface characteristics to be encountered between bore holes and its own interpretations of the fluctuation of the level of subsurface water (if any) at and between bore holes.
   c. A copy of the above report has been included with the specifications.

SC-4.06 Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

SC-4.06.A In the preparation of the Drawings and Specifications, Engineer has not utilized any report or drawing related to a Hazardous Environmental Condition identified at the Site.

SC-4.06.B (Not Used)

SC-5.01.A Modify the first part of the second sentence of Paragraph 5.01.A of the General Conditions to read:

These bonds shall remain in effect for **one (1)** year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents.

SC-5.04.B.1 Delete the first sentence of Paragraph 5.04.B.1 and insert the following sentence:

The liability limits shall be not less than **$1,000,000** Single Limit.

SC-5.04.B.2 Delete the first sentence of Paragraph 5.04.B.2 and insert the following sentence:

The liability limits shall be not less than **$1,000,000** Single Limit.

SC-5.04.B.4 Delete the first sentence of Paragraph 5.04.B.4 and insert the following sentence:

The liability limits shall be not less than **$5,000,000**.

SC-9.03 Add a new paragraph immediately after Paragraph 9.03.A, which is to read as follows:

SC-9.03.B Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

1. Duties and Responsibilities to RPR:

a. Schedules: Review the Progress Schedule, Schedule of Submittals and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

b. Conferences and Meetings: Attend meetings with Contractor , such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

c. Liaison:
   1) Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in providing understanding of the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's operations on the Site.
   2) Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

d. Shop Drawings and Samples:
   1) Record date of receipt of Shop Drawings and Samples, which are received at the Site.
   2) Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
   3) Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or Sample if the submittal has not been approved by Engineer.

e. Review of Work, Rejection of Defective Work, Inspections and Tests:
   1) Conduct observations of the Work in progress on the Site to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
   2) Report to Engineer whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform generally to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
   3) Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startups.
   4) Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.

f. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

g. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.

h. Records:
   1) Maintain at the Site orderly files for correspondence, reports of job conferences, Shop Drawings and Samples, and reproductions of original Contract Documents including all Addenda, Change Orders, Work Change Directives, Field Orders, additional Drawings issued subsequent to the execution of the Agreement, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
   2) Keep a record, recording Contractor's hours on the Site, weather conditions, data relative to questions on Change Orders or changed conditions, list of visitors to the Site, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.
   3) Record names, addresses and telephone numbers of all Contractors, Subcontractors and major suppliers of materials and equipment.

i. Reports:
   1) Furnish Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Submittals.
   2) Consult with Engineer in advance of scheduled major tests, inspections or start of important phases of the Work.
   3) Draft proposed Change Orders, obtaining backup material from Contractor and recommend to Engineer Change Orders and Field Orders.
   4) Report immediately to Engineer and Owner upon the occurrence of any Site accident, any Hazardous Environmental Condition, emergencies or acts of God endangering the Work, or property damage by fire or other cause.

j. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and submit recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed and materials and equipment delivered at the Site but not incorporated in the Work.

k. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.

l. Completion:
   1) Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.
   2) Observe whether Contractor has arranged for inspections required by Laws and Regulations, including but not limited to those to be performed by public agencies having jurisdiction over the Work.
   3) Conduct final inspection in the company of Engineer, Owner and Contractor and prepare a final list of items to be completed or corrected.
   4) Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning acceptance of the Work.

2. Limitations of Authority of RPR: RPR shall not:
   a. Authorize any deviation from the Contract Documents or substitution of materials or equipment, including "or equal" items.
   b. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
   c. Undertake any of the responsibilities of Contractor, Subcontractors or Contractor's superintendent.
   d. Advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.
   e. Advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.
   f. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
   g. Authorize Owner to occupy the Project in whole or in part.
   h. Participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

SC-13.07 Modify Paragraph 13.07.A by changing the word "eighteen months" in the first line to **one (1)** year.

ARTICLE SC-14 – PAYMENTS TO CONTRACTORS AND COMPLETIONS

SC-14.02 A.7 Effective January 1, 2017, generally all Repair, Maintenance and Installation (RMI) services and service contracts will be taxable unless specifically exempted and in

accordance with North Carolina General Statutes 105-164.3(33e), 105-164.4(a)(13), and 105-164.4H. In compliance with this law, the Owner has supplied the "Affidavit of Capital Improvement" (E-589CI) to inform the Contractor that this project or a portion thereof meets the definition of a Capital Improvement and therefore is taxed for sales and use tax purposes as a real property contract with respect to a capital improvement to real property.

ARTICLE SC-18 - STATUTORY REQUIREMENTS

SC-18.01 This Article contains portions of certain Laws or Regulations which, by provision of Law or Regulations, are required to be included in the Contract Documents. The material included in this Article may not be complete or current. Contractor's obligation to comply with all Laws and Regulations applicable to the Work is set forth in Paragraph 6.09 of the General Conditions.

SC-18.02 Senate Bill 914 Dispute Resolution is provided in Attachment 1.

PARKER & ASSOCIATES, INC.
ENGINEERS · SURVEYORS · PLANNERS
JACKSONVILLE, NORTH CAROLINA

AutoCAD File Release Waiver

Project:_____ **Location:**_____

Recipient Name/Title:_____

Company Name:_____

Surveyor (If Applicable):_____

In accepting and utilizing any drawings, reports and data on any form of electronic media generated and furnished by Parker & Associates, Inc. (Consultant), the Recipient agrees that all such electronic files are instruments of service of the Consultant, who shall be deemed to be the author, and shall retain all common law, statutory law and other rights, without limitation, including copyrights.

The Recipient agrees not to reuse these electronic files, in whole or in part, for any purpose other than for the Project. The Recipient agrees not to transfer these electronic files to others without the prior written consent of the Consultant. The Recipient further agrees to waive all claims against the Consultant resulting in any way from any unauthorized changes to or reuse of the electronic files for any other project by anyone other than the Consultant.

The Recipient is aware that differences may exist between the electronic files delivered and the printed hard-copy construction documents. In the event of a conflict between the signed construction documents prepared by the Consultant and electronic files, the signed or sealed hard-copy construction documents shall govern.

In addition, the Recipient agrees, to the fullest extent permitted by law, to indemnify and hold harmless the Consultant against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising from any changes made by anyone other than the Consultant or from any transfer or reuse of the electronic files without the prior written consent of the Consultant.

Under no circumstances shall delivery of electronic files for use by the Recipient be deemed a sale by the Consultant, and the Consultant makes no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall the Consultant be liable for indirect or consequential damages as a result of the Recipient's use of the electronic files.

For Use In Construction Staking:
The practice of construction staking, including the creation and design of the controls, profiles, and cross sections for the electronic data used in the Digital Terrain Models for the purposes of earthwork grading and stake-out falls within the definition of land surveying as defined in GS 89C-3(7)a.2, and shall be done under the responsible charge of a Professional Land Surveyor. The Parties hereto covenant and acknowledge that the Consultant is providing the electronic files and materials to the Surveyor as the responsible charge of the construction staking for the project.

Recipient _____ **Date:**_____
(signature)

Surveyor _____ **Date:**_____
(If Applicable) **(signature)**

Forms&DocsShared.Parker.AutoCADReleaseWaiver.11.6.17

306 New Bridge Street | P.O. Box 976 | Jacksonville, NC 28541-0976 | (910) 455-2414 | Fax (910) 455-3441
Firm License Number F-0108 | www.parkerjacksonville.com

Addendum #2 incorporated into Jacksonville Station Re-Bid

ADDENDUM NO. TWO

24 FEBRUARY 2020

PROJECT TITLE: **JACKSONVILLE STATION**
1300 NORTH MARINE BOULEVARD/HWY 17 NORTH
JACKSONVILLE, NORTH CAROLINA
JACKSONVILLE PROJECT NO. BP19-00002283
HRA COMMISSION #189518.00

ADDENDUM:

I. Contents of this addendum are to be part of the overall Bid Documents

II. Project Bid Date: **11 AM WEDNESDAY, 11 MARCH 2020**
   A. Per email dated 18 February 2020; It is important to note that with this addendum, the bid date has been moved to March 11, 2020 at 11AM. The City is still working through a few RFI questions and will be issuing another addendum soon. The last day to submit a RFI is Monday, February 24th which would allow the final addendum to be issued no later than Monday, March 2nd

II. Prospective Bidder Questions.
   1. The controls spec section 15975 para 2.1.1 shows thermostats for the PACU's shall be by JCI. The RTU sequence of operation on M0.4 just says the control system shall interface to the City of Jacksonville's master control system via BACnet. There is no list of approved controls contractors, control systems, or info on the "City of Jacksonville's Master Controls System". Is anyone one else approved to bid controls other than JCI?

      Response:
      Controls for rooftop units shall be accomplished using manufacturer's standard stand-alone controller and do not need to interface with the City of Jacksonville's master control system.

2. There is no spec section for the Liebert split system shown on M0.1. Will a spec section be issued?

   Response:
   The conditioning needs have been re-evaluated for the IT room and the Liebert unit specified on the construction drawings will no longer be needed. Instead, the Liebert unit will be replaced with a 1-ton DX 4-way ceiling cassette unit, such as the Mitsubishi P-series unit (model PLA-A12EA7 or equal). Controls for the unit will be stand-alone and the specs for the unit will be provided on the drawings via air handler schedule.

3. The RTU's are specified to have 24" hurricane roof curbs. Does CU-1 need to have hurricane roof rails?

   Response: Condenser unit, CU-1, shall be provided with hurricane roof rails.

4. Div 12. Window Treatments --Section 1.2.1 states "blinds to be provided at all windows." Section 3.6.1.1.2 states "On all exterior windows." Are we to include interior windows? Sidelites in offices?

   Response:
   Only the exterior wall windows

DRAWINGS/SPECIFICATION:

Drawings:

Architectural:

1. Drawing #A2.4_FloorPlan – Transportation/Administration Wing - Layout:
   a. Staff Meeting Room #106 and I.T. Room #114, overall room sizes have been revised – See attached ACN-A-001; along with associated plumbing, mechanical and electrical listed below.
2. Drawing #A9.2 Door Schedule:
   a. Transportation/Administration Wing/Door #114 – Delete frame/door assembly 20 Min. rating requirement.

Plumbing:

1. Transportation/Administration Wing I.T. Room #114:
   a. Remove the floor drains required for in-line cooling units. Remove ½" cw line originally serving the AH humidifier.

Mechanical:

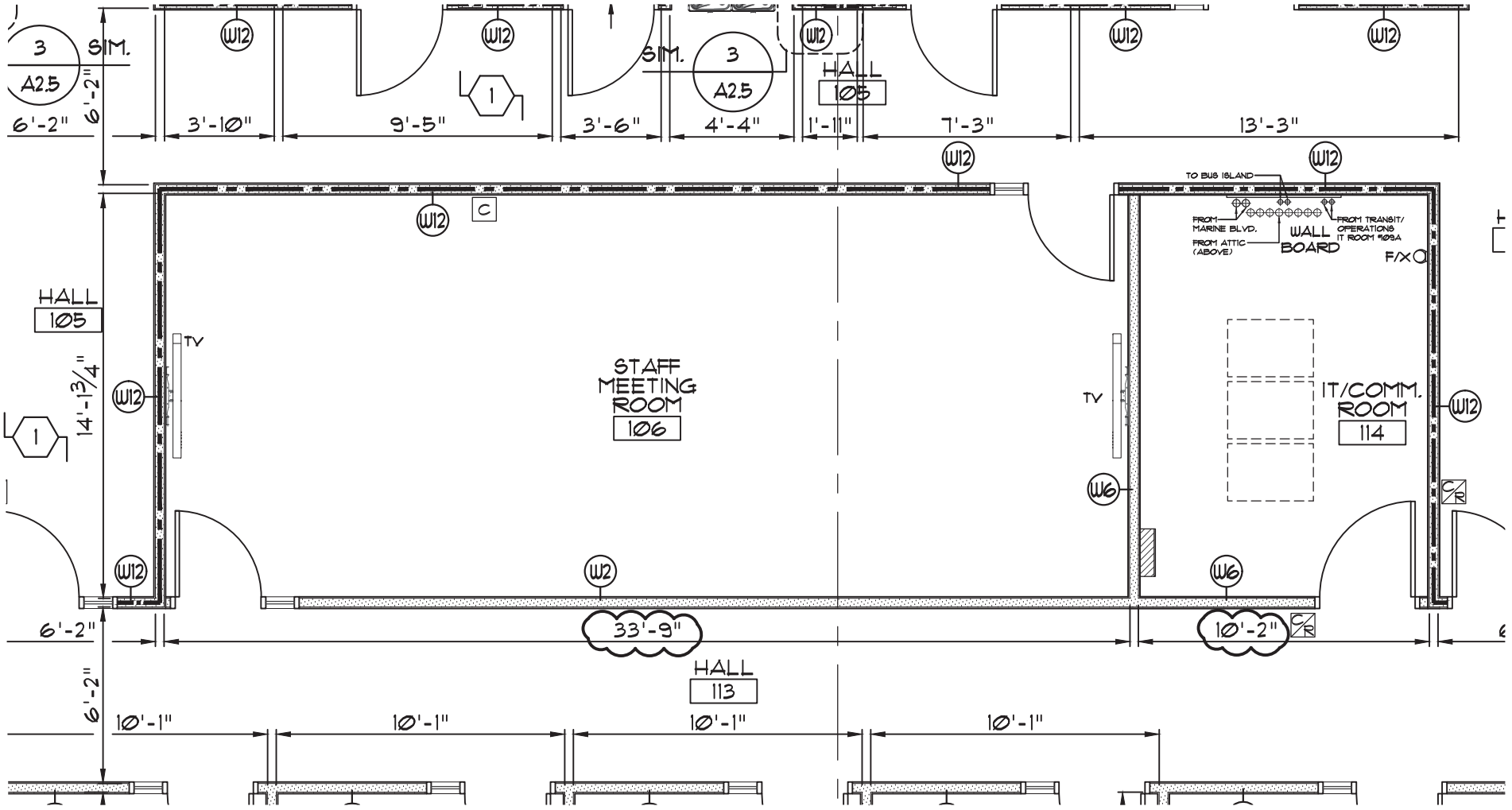
1. Transportation/Administration Wing I.T. Room #114:
    a. Delete 5-ton Liebert system serving IT/Communications Room #114 including all associated ductwork, diffusers and grilles from the plans. Replace Liebert unit with a ductless ceiling-mounted cassette unit with remote thermostat mounted in IT/Communications Room.

Electrical:

1. Transportation/Administration Wing I.T. Room #114:
    a. Server equipment quantity reduced and UPS (power supply) has been integrated into the server racks. Panel breaker quantity/sizes to remain the same as scheduled.
2. Coordinate electrical feed and breakers to revised mechanical equipment.
3. Add breakers and conduit out to parking lot (last two (2) parking spaces at southwest corner of the Transportation wing near standby generator). Coordinate and include owner furnished car chargers.
4. Shift receptacles and equipment to match new floor plan in IT room and Staff Meeting room.

John W. Farabow Jr. AIA NCARB
Project Architect





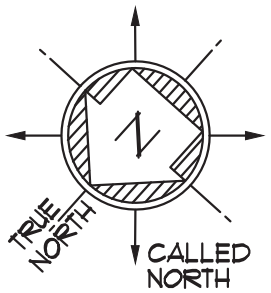
1 TRANSPORTATION/ADMINISTRATION WING - LAYOUT

1 / A2.4

3/16" = 1'-0"

2 0 2 4 6 8 10 12 14

scale feet



H R ASSOCIATES, P.A.
ARCHITECTURE - INTERIOR DESIGN
RALEIGH, NORTH CAROLINA

STAFF MEETING ROOM #106/
I.T. ROOM #114 SIZE CHANGE

DRAWN BY:	CHECKED BY:	DATE:	REVISION:
GDG	JWF	2/24/2020	-

H R ASSOC. JOB NUMBER: 189518.00

hra

PROJECT: JACKSONVILLE STATION

COLLOCATION CHANGE NOTICE NO: ACN-A-001

SHEET: 1 of 1

DRAWING NUMBER AFFECTED: A2.3, A2.4 & A9.2

Addendum #1 incorporated into Jacksonville Station Re-Bid

ADDENDUM NO. ONE

17 FEBRUARY 2020

PROJECT TITLE: **JACKSONVILLE STATION**
1300 NORTH MARINE BOULEVARD/HWY 17 NORTH
JACKSONVILLE, NORTH CAROLINA
JACKSONVILLE PROJECT NO. BP19-00002283
HRA COMMISSION #189518.00

ADDENDUM:

I. Contents of this addendum are to be part of the overall Bid Documents

PREBID AGENDA/DISCUSSION:

I. Sign In:
   A. Introductions

II. Project Bid Date:
   A. March 5, 2020 at 3PM at which time they will be read publicly aloud in Meeting Room A of Jacksonville City Hall. Review of Bid Proposals will be completed by the end of March with project awarded in April; and construction start the first of May.

III. The City of Jacksonville reserves the right to waive any informalities, to reject any or all bids, and to accept that Bid or Bids which appear to be in the Owner's best interest. Refer to the Instruction to Bidders.

IV. Bid Documents:
Bidders are required to obtain an official complete set of Bid Documents from the City and to be registered on the Plan Holders list. Updated plan holders list has been included with this addendum

V. Project Description:
The project consists of a new bus transit facility with an approximately 15,000 square foot transit/administration building and associated bus unloading/loading area located at the intersection of East Thompson and Marine Boulevard.

VI. Bid Structure:
   A. Base Bid
   B. Identify PME Subcontractors
   C. 7 Alternates
   D. Unit Prices – City reserves the right to reject any unreasonable unit price per Specification/ Section 01026 Unit Prices.

VII. Bid Package Requirements:
   A. Sealed Bid
   B. Five percent Bid Security
   C. Bidders Qualification Statement
   D. Attachment A – Lobbying Certification
   E. Attachment B – Buy America Compliance **OR** Attachment C – Buy America Non-Compliance
   F. Attachment D – Debarment, Suspension, Ineligibility Certification
   G. Attachment E – DBE Utilization Form
   H. Attachment F – Intent to Perform as Subcontractor
   I. Attachment G – Affidavit of No Change DBE Business

VIII. Construction Contract Schedule
   A. Substantial completion – 365 days after issuance of notice to proceed.
   B. Final payment – 30 days thereafter
   C. Building permit and all other required permitting have been obtained.

IX. Liquidated Damages - $700 for each day

X. Construction Coordination:
   A. Owner: City of Jacksonville
   B. Project Manager: Deanna Trebil, City of Jacksonville, dtrebil@jacksonvillenc.gov or (910) 938-5073
   C. Architect: John Farabow, HR Associates, farabow@hrassociates.com
   D. All questions from General Contractors shall be in written e-mail form sent to city Project Manager Deanna Trebil (dtrebil@jacksonvillenc.gov) with Project Architect John Farabow (farabow@hrassociates.com) copied.
   E. Subcontractors will be provided with list of bidders when requested; however subcontractor questions will not be addressed unless submitted by a General Contractor bidder.
   F. Addendum No. One will incorporate notes from this meeting will be posted by Monday, 17 February 2020.
   G. Updated list of Plan Holders will be incorporated into Addendum No. One.

XI. Special Construction Items:

A. Federally funded project-Davis Bacon and Buy America will apply.
B. Existing soils mediation with respect to special structural foundation. Reference Structural drawing #S2.4 and Specification Section 02200-Earthworks.

XII. Prospective Bidder Questions.

1. What is defined as a manufactured good with respect to Davis Bacon? Are there any known waivers that might apply to this project?
   49 U.S.C. § 5323(j)(1) states that a manufactured good is considered produced in the United States if:

   (1) All of the manufacturing processes for the product take place in the United States; and

   (2) All of the components of the product are of U.S. origin. A component is considered of U.S. origin if it is manufactured in the United States, regardless of the origin of its subcomponents. 49 CFR 661.5(d).

   49 U.S.C. § 661.5(c) states "the steel and iron requirements apply to all construction materials made primarily of steel or iron and used in infrastructure projects such as transit or maintenance facilities, rail lines, and bridges. These items include, but are not limited to, structural steel or iron, steel or iron beams and columns, running rail and contact rail. These requirements do not apply to steel or iron used as components or sub components of other manufactured products or rolling stock, or to bimetallic power rail incorporating steel or iron components.

   There is a Buy America Waiver for Small Purchases which are those less than $150,000. This waiver can be used by the General Contractor and passed down to the Prime Subcontractor only. With some planning, this is a valuable tool that can be utilized. For example, if the General Contractor subs out a general electrical contract for $500K (which includes the HVAC) there is no $150K waiver available. However, if the General Contractor subs a contract out just for the HVAC (including product and labor) for $145K, but contracts with another sub for the remaining ~$350K of electrical work, the $150K threshold would apply to the HVAC contract. Please note that you cannot split contracts just to avoid Buy America. The referenced Buy America waiver is included as part of this addendum. Additionally, the Buy America Requirements found on page 138 specifically state that this requirement only applies to projects more than $150,000.

   There is another Buy America Waiver for Microprocessors, Computers, Microcomputers, Software, or Other such devices which are solely for the purchase of processing or storing data. This waiver is included as part of this addendum as well.

2. Does Attachment E – DBE Utilization Form need to be submitted with the bid?
   Yes, Attachment E – DBE Utilization Form identifies all disadvantaged businesses that will be a subcontractor or supplier to this project and is required to be submitted with your bid. Refer to the DBE Participation section within the Supplemental Conditions on page 141 of the bid document.

3. Does Attachment G- Affidavit of No Change for DBE Businesses?
   Yes, Attachment G – Affidavit of No Change for DBE Businesses should be completed by the DBE firm(s) that will be a subcontractor or supplier to this project and is required to be submitted with your bid.

4. Would the City consider extending the project duration to 18 months?
   No, the construction length will remain as stated with substantial completion with twelve months of issuance of the Notice to Proceed. However, additional time can be granted in accordance with the General Conditions if required.

5. Would the City consider extending the bid date one (1) week to allow for procurement of better pricing from vendors and subcontractors?
   We have received a few requests to move the bid due date. After considering this request and our timeline, the bid due date has been moved to March 11th at 11AM. The meeting location has not changed.

6. What is the amount of the system development fees?
   The system development fees are based off of the size of the meter. The meter size for Jacksonville Station is 3". Based on the FY20 Fee Schedule for the City of Jacksonville, the system development fees for Jacksonville Station total $92,489 ($41,992 for water and $50,497 for sewer). The General Contractor is responsible for paying this fee along with all other building permit fees as part of this project in accordance with the General Conditions.

7. What is the amount for the building permit fees for Jacksonville Station?
   The City has already submitted the plans to the City's Building Inspection Department for review and approval. If the General contractor includes all sub-contractors on the initial building permit, the application fee is $9,202.25. If sub-contractors have to apply on their own, it will be a $25.00 fee per sub-contractor.

8. What is the construction budget for this project?
   The construction budget for this project is $8-10M depending on the available funding from the various funding sources.

9. Can a newly formed company that spun off another company qualify to bid this project?
   A newly formed company that spun off another company (i.e. company name change, created a new company, etc) may submit a bid on this project as long as they complete the Bidder's Qualification Statement answering applicable questions for both the newly formed company as well as the initial company. There are several questions that ask about the company's history over past five year period (Questions 7-13) as well as previous project experience (Question 14 and 17). It is the bidder's responsibility to provide enough information to show that the company submitting a bid has the experience and financial capacity to construct a project of this size.

XIII. Miscellaneous Discussion.

A. System Development Fee related to new water/sewer service is the responsibility of the contractor.
B. Building Permit cost is the responsibility of the contractor.
C. Testing services will be the responsibility of The City of Jacksonville.
D. RFI Deadline will be Monday, 24 February 2020 to allow for last Addendum (if needed) to be issued no later than Monday, 2nd March 2020. Per 00210/Invitation to Bidders/Article 9. Interpretations and Addenda 9.01

DRAWINGS/SPECIFICATION:

Drawings:

Civil:

1. Drawing #C1.0/#C1.2 Overall Site Plan – Proposed 5-foot sidewalk:
   a. At E. Thompson Street noted "Work By Others" is part of this project scope; along with additional sidewalk at south side of driveway entry to property line.
2. Drawing #C1.8 Wet Detention Basin Plan:
   a. Change "Vegetated Shelf" from 5-Feet to 10-Feet.

Architectural:

1. Drawing #A1.1 Overall Floor Plan:
   a. General Notes/Note #7A – Change 7-Pin padlock to 6-Pin.
2. Drawing #A2.5 Column-Wall Details:
   a. Detail #8C/A2.5 Typical Column Detail – Revise Alternate note to "Alternate No. Six/Seven Base Bid
3. Drawing #A8.1 Door-Window Elevations
   a. Detail #3/A8.1 Typical Interior Door Elevations #E13, #E14 and #E15 – add note "Provide Fire Rated Glazing equal to Frame/Door rating at all rated door assemblies".
4. Drawing #A9.1 Door Schedule:
   a. Transportation/Administration Wing/Door #102B – Add closer to scheduled hardware.

5. Drawing #A9.2 Door Schedule:
    a. Transportation/Administration Wing/Door #104A – Add closer to scheduled hardware.
    b. Transportation/Administration Wing/Door #105B – Add closer to scheduled hardware.
    c. Transportation/Administration Wing/Door #106B – Add closer to scheduled hardware.
    d. Transportation/Administration Wing/Door #115 – Add closer to scheduled hardware.
6. Drawing #A11.2 RCP Transportation/Administration Wing:
    a. Break Area #116/Door #E5 – Add exit light.

Electrical:

1. Drawing #E0.2 Tel/Com Riser Diagram:
    a. Typical Telephone Riser Diagram Notes:
    Change notes #6A/#6B to #6. Also add note under Alternate No. Six/Seven – terminate conduits 6" above concrete bus islands, along with a 12"x12"X24" high protective pedestal.

John W. Farabow Jr. AIA NCARB
Project Architect



U.S. Department
Of Transportation
Federal Transit
Administration

Headquarters

1200 New Jersey Avenue S.E.
Washington DC 20590

SEP 16 2016

Dear Colleague:

The Fixing America's Surface Transportation (FAST) Act made several changes to the Federal Transit Administration's (FTA) Buy America program. I write to highlight one of them and bring to your attention modifications that will impact the transit industry. As you know, FTA's Buy America statute requires that the steel, iron and manufactured products used in FTA-funded transit projects must be produced in the United States.

In 1995, FTA issued a general public interest waiver under 49 U.S.C. §5323(j)(2)(A) and 49 CFR 661.7(b) to exempt from its Buy America requirements all "small purchases," defined as purchases of $100,000 or less, made by its recipients with FTA financial assistance, including capital, planning, or operating assistance. With the passage of the Uniform Guidance, also known as the Super Circular (2 CFR part 200), the definition of small purchases was tied to the simplified acquisition threshold in the Federal Acquisition Regulation (FAR), which increased the small purchase waiver to $150,000. 2 CFR 200.88. Now, with the FAST Act, Congress has defined "small purchase" for purposes of the general public interest waiver as purchases of $150,000 or less. 49 U.S.C. § 5323(j)(13). Notably, as it is now statutorily fixed, the small purchase threshold for purposes of Buy America will not increase with future adjustments made to the simplified acquisition threshold under the FAR.

Additionally, the statutory language is clear that the small purchase waiver applies to *purchases* of $150,000 or less, regardless of the size of the project. Therefore, purchases made with FTA financial assistance, including capital, planning, or operating assistance, are subject to the waiver. The waiver applies both to purchases made directly by recipients or subrecipients and to purchases made by third-party contractors on behalf of the recipient or subrecipient. This provision of the FAST Act applies to all purchases made after October 1, 2015.

I also want to take the opportunity to clarify several points surrounding the practical applications of the waiver. The $150,000 contract value is based on the total contract amount, including labor and options, and not just the value of the goods purchased. Also, be mindful that recipients are not permitted to break up procurements in order to stay under the $150,000 threshold. Finally if your procurements may result in bids near $150,000, recipients should include the Buy America certifications in the solicitation, with a note clarifying that if the bid is more than $150,000, the bidder must certify per the Buy America requirements, but if the bid is $150,000 or less, no certification will be necessary.

As always, thank you for your commitment to Buy America and U.S. jobs. As you take time to review the new FAST Act provisions, I encourage you to visit FTA's Buy America website at www.transit.dot.gov/regulations-and-guidance/buy-america/buy-america.

Sincerely yours,

Ellen Partridge
Chief Counsel

U.S. Department
Of Transportation
Federal Transit
Administration

Chief Counsel

1200 New Jersey Avenue S.E.
Washington, DC 20590

JUL 9 2015

Jennifer M. Bruner
Director of Compliance & Civil Rights
IndyGo
1501 West Washington Street
Indianapolis, IN 46222

Re: *Buy America Waiver for Microprocessors, Computers, Microcomputers, Software, or other such devices which are used solely for the purpose of processing or storing data*

Dear Ms. Bruner:

I write in response to your April 16, 2015 letter in which you asked the Federal Transit Administration the applicability of the permanent, general public interest waiver from Buy America requirements set forth in Appendix A to 49 C.F.R. 661.7 to a list of equipment associated with the digital camera surveillance system to be procured from Simplex Grinnell for the transit center facility and site.

The requirements concerning domestic preference for federally funded transit projects are set forth in 49 U.S.C. § 5323(j). The Buy America requirements may be waived if the item or items being procured are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality. 49 C.F.R. § 661.7(c). There is a permanent waiver for microcomputer equipment and software:

> A general public interest waiver from the Buy America requirements applies to microprocessors, computers, microcomputers, or software, or other such devices, which are used solely for the purpose of processing or storing data. This general waiver does not extend to a product or device which merely contains a microprocessor or microcomputer and is not used solely for the purpose of processing or storing data.

49 C.F.R. 661.7, Appendix A.

In an earlier rulemaking, FTA provided some guidance regarding the definition of a microprocessor/microcomputer:

> A computer system whose processing unit is a microprocessor. A basic microcomputer includes a microprocessor, storage, and input/output facility, which may or may not be on one chip. The same source defines computer system as: A functional unit consisting of one or more computers and associated

> software, that uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program; executes user-written or user-designated programs, performs use-designated data manipulation, including arithmetic operations and logic operations; and that can execute programs that modify themselves during their executions. A computer system may be a stand-alone unit or may consist of several interconnected units. Synonymous with ADP system, computing system.

50 Fed. Reg. 18760 (May 2, 1985).

When the waiver is properly applied, a manufacturer may use foreign microcomputers and microprocessors without violating the Buy America requirements. In 2003, FTA withdrew a long-standing advanced notice of proposed rulemaking (ANPRM) seeking public comments on the microcomputer waiver, stating in its notice of withdrawal:

> It should be noted that FTA does not apply the waiver to an entire product because it contains a microcomputer. The parameters of the waiver as it currently exists are that if the end product is itself a microcomputer or software as defined above, Buy America is waived. If, however, the end product contains a microcomputer (e.g., a farecard system), that microcomputer is exempt from the requirements of Buy America, but the rest of the end product must be in compliance.

68 Fed. Reg. 9810 (Feb. 28, 2003).

FTA applied that reasoning to subsequent decisions, finding for example, that some components of a fare collection system were subject to the waiver, but others were not. Specifically, we found that "[t]he bill and coin validator, and the printer, are not, themselves, microcomputers, although they may each contain embedded microprocessors." CoinCard letter, May 23, 2003. *See also*, MTA letter, September 23, 2003, and Vansco Electronics letter, September 15, 2003.

FTA's treatment of computer equipment was reinforced by Congress in section 3023 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Pub. Law 109-59), in which Congress directed FTA to:

> [C]larify that any waiver from the Buy America requirements issued under section 5323(j)(2) of such title for a microprocessor, computer, or microcomputer applies only to a device used solely for the purpose of processing or storing data and does not extend to a product containing a microprocessor, computer, or microcomputer.

Consequently, this statutory directive was carried out through an implementing regulation published in 2007, following a public notice-and-comment process. 72 Fed. Reg. 53688 (September 20, 2007).

As discussed in the original definition, a microcomputer is a computer based on a microprocessor. A microprocessor is a computer whose central processing unit is contained on one or a small number of integrated circuits. Microcomputers may be stand-alone units or they may be embedded in other equipment. They must have, or be, controllers or communication processors and be capable of processing, storage, programming, and input/output facilities. Microcomputers may be grouped within larger systems or equipment, consisting of several interconnected units each functioning as either stand-alone units, embedded into the equipment or system, or a mix of both. Related hardware and equipment that may be controlled by a microprocessor is not covered by the microcomputer waiver. Accordingly, while your procurement includes the purchase of microcomputer equipment, all of the elements identified on this procurement are not covered by the waiver.

In the 2007 implementing regulation addressed above, FTA clarified the definition of "end products" to include "systems" (see, 49 CFR 661.3) and security systems are specifically identified in the list of representative list of "manufactured end products" in Appendix A to section 661.3. As a "manufactured end product," section 661.5(d) requires all of its components to be manufactured in the United States, and the attachment to your letter placed these components into categories labelled "PC Equipment," "Network Switch," "Server," "Data Storage," "Digital Cameras," and "PC component input device." You stated in your letter that all of the items should be included within the microprocessor waiver because they comprise the network components for IndyGo's Downtown Transit Center and its digital camera surveillance system.

Close review of your letter, however, indicates that some of the items are incorrectly categorized, and some are not covered under the microprocessor waiver. For example, the Samsung NC241 is listed as "PC Equipment," although this device is a video display monitor that FTA considers a "computer peripheral," as monitors are routinely purchased as stand-alone devices and merely display, rather than process or store data. Similarly, the Axis keyboard/joystick labelled as a "PC component input device" is a peripheral component of the system, as it merely plugs into a data processing unit, rather than being physically incorporated into a larger data processing unit. In contrast, many of the individual two-port network transceivers that are categorized as "network switches" are actually "subcomponents" because they physically and functionally are incorporated into larger electronic components, such as the HP 5500 48-port network switch or the HP 2530 50-port network switch.

Nevertheless, the switches are eligible for the microprocessor waiver because their primary function is to process data. The Dell PowerEdge server and the Dell Equallogic server are also covered under the waiver because their primary function is to process and store data. The HP transceivers are not subject to Buy America requirements because of their status as subcomponents. The remaining items – the video display monitor, the various digital cameras, and the keyboard/joystick – are not covered within the waiver because their primary function is greater than simply processing and storing data.

I hope this information has been helpful. If you have any questions, please contact Richard Wong at 202-366-0675 or richard.wong@dot.gov.

Sincerely,

Dana Nifosi
Acting Chief Counsel

cc: Derek Davis, FTA
Kathryn Loster, FTA
Richard Wong, FTA

Attachment A

Part Number	Category	Buy America
NC241	PC Equipment	Buy America Applies
HP J9853A	Network Switch	Microprocessor Waiver Applies
HP J9152A	Network Switch	Microprocessor Waiver Applies
HP J4858C	Network Switch	Microprocessor Waiver Applies
HP JG239A	Network Switch	Microprocessor Waiver Applies
HP JD359B	Network Switch	Microprocessor Waiver Applies
HP JD108B	Network Switch (Transceiver)	Subcomponent – Buy America does not apply
HP JD117B	Network Switch (Transceiver)	Subcomponent – Buy America does not apply
HP JD368B	Network Switch	Microprocessor Waiver Applies
HP JD097C	Network Switch	Microprocessor Waiver Applies
HP JH012A	Network Switch	Microprocessor Waiver Applies
Dell R530	Server	Microprocessor Waiver Applies
Equallogic PS6510e or Equivalent	Data Storage	Microprocessor Waiver Applies
WV-SW598	Digital Cameras	Buy America Applies
WV-Q122A	Digital Cameras	Buy America Applies
P3384-VE	Digital Cameras	Buy America Applies
P3365-VE	Digital Cameras	Buy America Applies
P3365-V	Digital Cameras	Buy America Applies
SNV-6012N	Digital Cameras	Buy America Applies
WV-SF138	Digital Cameras	Buy America Applies
M3007-P	Digital Cameras	Buy America Applies
5020-101/201	PC Component input device	Buy America Applies

City of Jacksonville

Public Services Department
Engineering Division
PO Box 128 • Jacksonville NC 28541-0128 • 910 938-5233

Formal Bid List of Plan Holders

JACKSONVILLE STATION
BID NO. FY 20-07

Pre-Bid Meeting Date and Time: **February 11, 2020 at 1:30PM in Meeting Room A**
Bid Due Date: **March 5, 2020 at 3PM in Meeting Room A**
Project Manager: **Deanna Trebil**

Bryan Tessier Bar Construction Company 611-A Industrial Ave Greensboro, NC 27406 (336) 274-2477 Btessier@barconstruction.com	John Cheshire Clancy & Theys johncheshire@clancytheys.com	Dean Denning Monteith 910-791-8101 ddenning@monteithco.com
John Berry Berry Building Group Jberry@berrybg.com 252-378-4123	David Blizzard Blizzard Construction blizzardconstruction@embarqmail.com 910-289-6150	Layla Taylor Jenn's Hardscape 252-432-1246 ltaylor@jennsllc.com
Red Rooster Contractors (Roofing Contractor) 2015 Ayrsley Town Blvd Office Suite 202 Suite 206 Charlotte, NC 28273 redroostercontractors@gmail.com 704-634-4622	Amanda Criss, Admin Asst Primus Structures, Inc. 2896 Hwy 24, Suite H 252-764-2455 ph 252-764-2478 fax jim@primusstructures.com	Four Points Recycling, LLC 910.346.6299 Office 910.333.5961 Mobile 910.346.7549 Fax carrollraynor@gmail.com
Leslie Walthall H.G. Reynolds Company, Inc. Office: (252) 492-3071 ext. 7 P.O. Box 209 Henderson, North Carolina 27536 lwalthall@hgreynolds.net klong@hgreynolds.net	Tyler Chaucer Barnhill Contracting 4312 Henson Dr Wilmington, NC 28405 tchaucer@barnhillcontracting.com	Erik Ast Military and Federal cjusten@militaryandfederalc.com ejast72@gmail.com 252-503-0864
Donald Shingleton TEAM Construction 910-381-5394 dshingleton@teamconstructionnc.com	Thomas Sibley Sibley Welding Service, LLC Thomas.sibleyjr@gmail.com	Arlyn Smith Burney & Burney Construction 252-414-9433 Arlynsmith75@yahoo.com

City of Jacksonville

Sign-In Sheet for Pre-Bid Meeting

Jacksonville Station

February 11, 2020

Name and Company	Phone Number	Email Address
Deanna Trebil, Project Manager, City of Jacksonville	(910) 938-5073	dtrebil@jacksonvillenc.gov
Roy Bredahl, Transit Operations manager, City of Jacksonville	(910) 938-5037	Rbredahl@jacksonvillenc.gov
Anthony Prinz, Transportation Services Director, City of Jacksonville	(910) 938-1473	aprinz@jacksonvillenc.gov
John Farabow, Architect, HR Associates	(910) 343-6008	Farabow@hrassociates.com
Donald Shingleton Supt. UC Manager TEAM CONSTRUCTION SSHO	(910)320-8528	estimating@teamconstructionnc.com
ERIK AST Mil & Fed Civil	(252)503-0864	EJAST72@gmail.com
ERIC ZALESKI PRIMUS STRUCTURES	(252) 764-2455	jime primusstructures.com ~~eric@primusstructures.com~~
Tyler Chaucer Estimator/Project Manager Barnhill Contracting Company	(910) 899-2202	tchaucer@barnhillcontracting.com
DEAN DENNING MONTEITH	910.791.8101	ddenning@monteithco.com
Jason McLeod ECS Southeast	910-880-2137	JMCLEOD@ECSLimited.com
Ken LONG H. G. REYNOLDS Co. INC	252-492-3071	klong@hgreynolds.net klong@hgreynolds.net
Troy Taylor East Coast Contracting	910-250-6022	ttaylor@eccwilm.com

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CITY OF JACKSONVILLE, NORTH CAROLINA

Jacksonville Station
Bid No. FY 20-07**A**

00110 ADVERTISEMENT FOR BIDS

Sealed Bids from qualified Bidders for the construction of the Jacksonville Station will be received, by the City Clerk of the City of Jacksonville, at Meeting Room A, Jacksonville City Hall, 815 New Bridge Street, Jacksonville, NC 28540, until **3:00PM** Eastern Standard Time on ~~**March 5, 2020**~~ **April 9, 2020**, at which time they will be publicly opened and read.

The project consists of a new bus transit facility with an approximately 15,000 square foot transit/administration building and associated bus unloading/loading area. **This project is being re-advertised and as such, previously issued Addendums 1-3 are hereby incorporated by reference as if fully set out. Please note that there have been minor revisions to the plans. Interested bidders should requested the latest bid manual and plan set from the City of Jacksonville to ensure that they have the latest information.**

Bids will be received on Single Prime contract basis. Bids shall be on a lump sum and/or unit price basis.

Bidding Documents may be examined at the office of the Owner, Transportation Department, City Hall, 815 New Bridge Street, Jacksonville, NC 28540. Copies may be obtained from the offices of the Owner, Transportation Department, City Hall, 815 New Bridge Street, Jacksonville, NC 28540. Partial sets of Bidding Documents will not be available. Neither the Owner nor the Engineer will be responsible for full or partial sets of Bidding Documents, including any addenda, obtained from other sources. Persons requesting shipment of documents shall bear the additional, non-refundable cost of shipment.

Bid and Contract securities shall be provided in accordance with Articles 10 and 23 of the Instructions to Bidders.

~~The City of Jacksonville will conduct a Pre-Bid meeting at City Hall, Meeting Room A, on **February 11, 2020** at **1:30PM** immediately followed by a site visit.~~

Bidders shall provide proof of qualifications to perform the Work as described in Article 5 of the Instructions to Bidders.

The Jacksonville City Council reserves the right to waive any informalities, to reject any

or all Bids, and to accept that Bid or Bids which appear to be in the Owner's best interest.

Bidders must be properly licensed under Chapter 87 of the North Carolina General Statutes and under Municipal Code 11-9.

"The City of Jacksonville is an Equal Opportunity Employer and Service Provider and encourages participation by small-, minority-, and female-owned firms." The Bidder's attention is called to the Equal Employment Opportunity Clause as shown in the Contract Documents. The Bidder must insure that employees and applications for employment are not discriminated against because of race, religion, creed, sex, or national origin. Bidders must make positive efforts to use small or minority business enterprises.

By: Deanna Trebil
Title: MPO Administrator
Date: January 2020

Engineer:

HR Associates, PA
John W. Farabow, Jr AIA
2202 Wrightsville Ave, Suite 212
Wilmington, NC 28403
(910) 343-6008 x 23

++ END OF ADVERTISEMENT FOR BIDS ++

00210 INSTRUCTIONS TO BIDDERS

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1. Defined Terms
2. Bids Received
3. Location and Description of Project
4. Copies of Bidding Documents
5. Qualifications of Bidders
6. Examination of Bidding Documents, Other Related Data and Site
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28. Partnering
29. Minority Business Contract Provisions
30. Applicable Law and Forum
31. E-Verify Compliance Provision
32. Iran Divestment Act

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

ARTICLE 2 - BIDS RECEIVED

2.01 Refer to Advertisement for Bids for information on receipt of Bids.

ARTICLE 3 - LOCATION AND DESCRIPTION OF PROJECT

3.01 Refer to Section 01010 for the location and description of the Project.

ARTICLE 4 - COPIES OF BIDDING DOCUMENTS

4.01 Refer to Advertisement for Bids for information on location where Bidders may examine and/or obtain Bidding Documents.

4.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

4.03 Owner and Engineer in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant permission for any other use.

ARTICLE 5 - QUALIFICATIONS OF BIDDERS

5.01 Bidders shall be experienced in the kind of Work to be performed, shall have the necessary equipment therefore, and shall possess sufficient capital to properly execute the Work within the time allowed. Bids received from Bidders who have previously failed to complete work within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A Bid may be rejected if Bidder cannot show that Bidder has the necessary ability, plant and equipment to commence the Work at the time prescribed and thereafter to prosecute and complete the Work at the rate or within the time specified. A Bid may be rejected if Bidder is already obligated for the performance of other work which would delay the commencement, prosecution or completion of the Work.

5.02 To demonstrate qualifications to perform the Work, Bidder shall complete and submit with its Bid a Bidder Qualifications Statement that is bound in the Project Manual. Bidders may be asked to furnish additional data to demonstrate their qualifications.

5.03 Bidders shall be qualified to do business in the state of North Carolina or covenant to obtain such qualification prior to signing the Agreement.

5.04 Bids will be received only from contractors who are licensed or registered by the State of North Carolina.

ARTICLE 6 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA AND SITE

6.01 Subsurface and Physical Conditions

A. Neither the Owner nor the Engineer has performed explorations of subsurface conditions in connection with the preparation of the Bidding Documents, nor have Owner or Engineer utilized any investigation that may have been performed by others.

6.02 Underground Facilities - Physical Conditions

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

6.03 Hazardous Environmental Condition

A. Owner has no actual knowledge of a Hazardous Environmental Condition at the Site.

6.04 Provisions concerning responsibilities for the adequacy of data, if any, furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unforeseen conditions appear in Paragraphs 4.02, 4.03 and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Bidding Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

6.05 Other Related Data

A. The Supplementary Conditions identify any other related data, if any, that Engineer has used in preparing the Bidding Documents.

B. These data are not part of the Contract Documents.

6.06 With prior notice, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests and studies. Bidder shall comply with all Laws and Regulations relative to such explorations, investigations, tests and studies.

6.07 With prior notice, Owner will conduct a Site visit during Owner's normal business hours.

6.08 Reference is made to Section 01010 for identification of the general nature of other work, if any, that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On request, Owner will provide to Bidder, for examination, access to or copies of the contract documents for such other work.

6.09 It is the responsibility of Bidder, before submitting a Bid to:

A. examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents and any Addenda;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local and Site conditions that may affect cost, progress and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work;

D. carefully study all applicable:

1. reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous

to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and

2. reports and drawings of Hazardous Environmental Condition identified at the Site, if any, which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;

E. obtain and carefully study (or assume responsibility for doing so) all applicable additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for the performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of work (if any) to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents;

I. promptly give Owner written notice of all conflicts, errors, ambiguities or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Owner is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

6.10 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 6, that without exception the Bid is premised upon performing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences or procedures of construction that may be shown or indicated and expressly required by the Bidding Documents, that Bidder has given Owner written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Owner are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing the Work.

ARTICLE 7 - PRE-BID CONFERENCE AND SITE VISIT

7.01 A pre-Bid conference and site visit will be held at the time, date and location set forth in the Advertisement for Bid. Bidders are urged to attend and participate at the conference. The purpose of the meeting is to provide Bidders with the opportunity to discuss the Project with the Owner. Any clarifications, corrections, or changes to the Bidding Documents resulting from the meeting will be included in an Addendum.

ARTICLE 8 - SITE AND OTHER AREAS

8.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents.

ARTICLE 9 - INTERPRETATIONS AND ADDENDA

9.01 All questions about the meaning or intent of the Bidding Documents shall be submitted to the Owner in writing. In order to receive consideration, questions must be received by the Owner at least ten days prior to the date for the opening of Bids. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Owner as having received the Bidding Documents for receipt not later than three days prior to the date for the opening of Bids. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

9.02 Direct all written questions by email to Deanna Trebil, MPO Administrator, dtrebil@jacksonvillenc.gov.

9.03 Addenda may also be issued to clarify, correct or change the Bidding Documents as deemed advisable by Owner or Engineer. Such Addenda, if any, will be issued in the manner and within the time period stated in Paragraph 9.01.

ARTICLE 10 - BID SECURITY

10.01 All proposals for construction or repair work shall be accompanied by bid security in the form of cash, or a cashier's check, or a certified check on some bank or trust company insured by the Federal Deposit Insurance Corporation in an amount equal to not less than five percent (5%) of the proposal. In lieu of making the cash deposit as above provided, Bidder may file a bid bond executed by a corporate surety licensed under the laws of North Carolina to execute such bonds.

10.02 Bid bond shall be on the form found in the Project Manual.

10.03 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to sign and deliver the Contract Documents and furnish the required contract security within 10 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited to the Owner as liquidated damages for such failure.

10.04 The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the 90th day after the Bid opening whereupon the Bid security furnished by such Bidders will be returned. The Bid security of Bidders whom Owner believes do not have a reasonable chance of receiving an award will be returned within seven days of the Bid opening.

10.05 Refer to Section 20000 FTA Provisions for additional requirements.

ARTICLE 11 - CONTRACT TIMES

11.01 The number of days within which the Work is to be substantially completed and also completed and ready for final payment (the Contract Times) are set forth in the Agreement.

ARTICLE 12 - LIQUIDATED AND SPECIAL DAMAGES

12.01 Provisions for liquidated and special damages, if any, are set forth in the Agreement.

ARTICLE 13 - SUBSTITUTE AND "OR EQUAL" ITEMS

13.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents or those substitute or "or equal" materials and equipment approved by Engineer and identified as approved by Addendum. Bidders are advised that the General Statutes of North Carolina, Chapter 133, requires that Contractor's request for Engineer to consider substitution of materials, items or equipment must be submitted to the Engineer for approval or disapproval such that approval or disapproval shall be made by the Engineer prior to the opening of the bids. The purpose of this statute is to mandate and encourage free and open competition on public contracts. In compliance with the cited General Statutes of North Carolina, the contact specifications have been prepared such that the required performance and material design characteristics are specified for materials, items and equipment. Where it is has not been possible or practical to specify based solely on the required performance and design characteristics, and to assist Bidders in determining potential manufacturers of specified materials items or equipment, the specification list names of manufacturers who the Engineer believes can provide materials, items or equipment which can be supplied to meet the requirements set forth in the specifications. Where possible, three manufacturers are named. Where the Engineer is not able to name three manufacturers, as many as could be named are listed. The Engineer makes no guarantees that any particular named manufacturers will agree to provide equipment in accordance with the specifications for the project, successful Bidder must determine for himself that all proposed manufacturers are willing to enter into a contractual relationship with the successful Bidder to provide equipment meeting the requirements set forth in the Contract Documents.

13.02 In an effort to assist the City and the prospective Bidders in reaching a common understanding as to which major manufacturer's equipment are

being proposed for this project by the Bidder, the ENGINEER has proposed a form entitled "Bidders' Proposed Manufacturers for Selected Materials, Items and Equipment". This form is included in the Bidding Documents with the separate bid forms. Bidder is required to place an "X" beside the selected item which indicates which manufacturer's equipment he will be proposing to provide for this project. Bidders should note that the form has been developed to list only major materials, items and equipment specified along the names of those manufacturers who the ENGINEER believes can comply with the Contract requirements specified. Should any Bidder wish to have an "or equal" manufacturer considered and added to the listing, he must submit a request to substitute equipment no later than 15 days prior to the receipt of Bids. After this period, no future requests for substitution will be accepted as reviews of substitution after this date would cause delay to the project schedule.

13.03 For all other items not listed on the form entitled "Bidder's Proposed Manufacturers for Selected Materials, Items and Equipment", Bidder is required to refer to specifications for listing of acceptable manufacturers. Should any Bidder wish to have an "or equal" manufacturer considered and added to the specifications, he must submit a request to substitute equipment no later than 15 days prior to the receipt of Bids. Within 15 days of the Bid date, no further requests for substitution will be accepted as reviews of substitution after this date would cause delay to the project schedule.

13.04 All additions of an "or equal" manufacturer will be made by Addendum.

13.05 Bidders are advised that no substitutions of materials, items or equipment will be considered after the bids are opened except in the case of unavailability of product or other conditions beyond the control of the successful Bidder.

13.06 All requests for substitution of materials, items, or equipment or equal or equivalent design shall be submitted to the Engineer in accordance with Article 6 of the General Conditions.

13.07 In accepting and evaluating bids in order to recommend award of the Contract to the Owner, Engineer makes no statement regarding the approval of manufacturer's equipment as noted in contract specifications. Upon execution of Contract, Contractor must comply with the Contract Documents requirements pertaining to Engineer's approval of shop drawings.

13.08 Refer to General Conditions for conditions under which the Engineer will accept applications for substitution or "equal" items of materials or equipment during the Contract period.

ARTICLE 14 - SUBCONTRACTORS, SUPPLIERS AND OTHERS

14.01 Identify all minority businesses proposed for use on this project in accordance with stated rules and regulations. In accordance with paragraph 6.06.C of the General Conditions, the apparent Successful Bidder, and any other Bidder so requested, shall submit to Owner a list of all such Subcontractors, Suppliers, other individuals or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualifications for each such Subcontractor, Supplier, individual or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual or entity, Owner may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

14.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers and other individuals or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

14.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual or entity against whom Contractor has reasonable objection.

ARTICLE 15 - PREPARATION OF BID

15.01 Bids shall be prepared using the Bid Form bound in the Project Manual. The Bid Form shall not be altered in any way.

15.02 A Bidder shall prepare its Bid by inserting bid amounts for each lump sum and unit price items as set forth on the Bid Form, and shall compute and

enter the computed total amount for all lump sum and unit price items in the space provided on the Bid Form.

15.03 All blanks in the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated in both words and numerals for each Bid item listed therein or the words “No Bid”, “No Change”, or “Not Applicable” entered. Ditto marks shall not be used.

15.04 A Bid shall be executed as stated below.

A. A Bid by an individual shall show the Bidder's name and official address.

B. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title shall appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

C. A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

D. A Bid by a corporation shall be executed in the corporate name by an officer of the corporation and shall be accompanied by a certified copy of a resolution of the board of directors authorizing the person signing the Bid to do so on behalf of the corporation. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The state of incorporation and the official corporate address shall be shown below the signature.

E. A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

F. All names shall be typed or printed in ink below the signature.

G. Contractor's license number, shall be entered in the space provided on the Bid Form.

15.05 The Bid shall contain an acknowledgment of the receipt of all Addenda, the numbers of which shall be filled in at the space provided on the Bid Form.

15.06 The address and telephone number for communications regarding the Bid shall be shown.

15.07 In addition to the Bid Form, the following listed documents, which shall be submitted with the Bid. Each document shall be executed in the manner described in Paragraph 15.03 unless another manner is indicated.

A. Bid Security

B. Bidder Qualifications Statement and supporting data

C. Attachment A – Lobbying Certification

D. Attachment B – Buy America Compliance **OR** Attachment C – Buy America Non-Compliance

E. Attachment D – Debarment, Suspension, Ineligibility Certification

F. Attachment E – DBE Utilization Form

G. Attachment F – Intent to Perform as Subcontractor

H. Attachment G – Affidavit of No Change DBE Business

ARTICLE 16 - NORTH CAROLINA SALES TAX

16.01 Refer to General Conditions paragraph Article 14.02A for information on Owner's refund of North Carolina sales tax and Contract requirements pertaining to Owner obtaining said refund.

ARTICLE 17 - SUBMITTAL OF BID

17.01 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids.

17.02 Bid shall be enclosed in an opaque sealed envelope plainly marked on the outside with the Project title, Bid number, the name and address of the Bidder and its license number, if applicable. Bid shall be accompanied by Bid security and other required documents.

17.03 If the Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notations "BID ENCLOSED", title of the work, Bid number, and name of the Bidder. A mailed Bid shall be addressed to:

City Clerk
City of Jacksonville
815 New Bridge Street
PO Box 128
Jacksonville, NC 28541

ARTICLE 18 - MODIFICATION OR WITHDRAWAL OF BID

18.01 Withdrawal Prior to Bid Opening:

A. A Bidder may withdraw its Bid before the time fixed for the opening of Bids by communicating his purpose in writing to the Owner. Upon receipt of such written notice, the unopened Bid will be returned to the Bidder.

18.02 Modification Prior to Bid Opening:

A. If a Bidder wishes to modify its Bid, Bidder must withdraw its initial Bid in the manner specified in Paragraph 18.01.A and submit a new Bid.

18.03 Withdrawal After Bid Opening:

A. A Bidder may request that his Bid be withdrawn from consideration without forfeiture of his Bid security in accordance with the provisions of North Carolina General Statute 143-129.1.

ARTICLE 19 - OPENING OF BIDS

19.01 All Bids shall be opened in public at the time and place indicated in the Advertisement for Bids and read aloud.

19.02 Bids received by mail or otherwise after the date and time specified for the opening of Bids will not be accepted and will be returned to the Bidder unopened.

ARTICLE 20 – BID PROTEST PROCEDURES

20.01 Pre-Proposal Protests: All protests concerning solicitation specifications, criteria and/or procedures shall be submitted in writing (defined as being sent or received via letter or facsimile on official firm/agency letterhead or by electronic mail) to the Deputy City Manager as specified below not later than 10 business days prior to the deadline for submission of bids/proposals.

The Deputy City Manager may, within his or her discretion, postpone the deadline for submission of bids/proposals, but in any case, shall provide a written response to all protests not later than five (5) business days prior to the deadline for submission of bids/proposals. If the deadline for submission of bids/proposals is postponed by the Deputy City Manager as the result of a protest the postponement will be announced through an addendum to the solicitation.

The decision by the Deputy City Manager shall be the final agency decision on the matter but shall be subject to judicial review as set forth by FTA below in 20.05.

20.02 Pre-Award Protests: With respect to protests made after the deadline for submission of bids/proposals but before contract award by Jacksonville Transit, protests shall be limited to those protests alleging a violation of Federal or State law, a challenge to the bids/proposals evaluation and award process, Jacksonville Transit's failure to have or follow its protest procedures or its failure to review a complaint or protest. Such protests shall be submitted in writing (defined as being sent or received via letter or facsimile on official firm/agency letterhead or by electronic mail) to the Deputy City Manager as specified below not later than five (5) business days after the Recommendation for Contract Award announcement by Jacksonville Transit.

The Deputy City Manager may, within his or her discretion, postpone the award of the contract, but in any case, shall provide a written response to all protests not later than three (3) business days prior to the date that Jacksonville Transit shall announce the contract award.

The decision by the Deputy City Manager shall be the final agency decision on the matter but shall be subject to judicial review as set forth for review by FTA as specified below in 20.05.

20.03 Requirements for Protests: All protests must be submitted to Jacksonville Transit in writing (defined as being sent or received via letter or facsimile on official firm/agency letterhead or by electronic mail), with sufficient documentation, evidence and legal authority to demonstrate that the Protester is entitled to the relief requested. The protest must be certified as being true and correct to the best knowledge and information of the Protester, be signed by the Protester, and be notarized. The protest must also include a mailing address to which a response should be sent.

Protests received after the deadlines for receipt of protests specified above are subject to denial without any requirement for review or action by Jacksonville Transit.

All protests must be directed in writing (defined as being sent or received via letter or facsimile on official firm/agency letterhead or by electronic mail) to:

Deputy City Manager
City of Jacksonville
P.O. Box 128
Jacksonville, NC 28451
E-mail: citymanager@jacksonvillenc.gov
Fax: (910) 455-6761

20.04 Protest Response: The Deputy City Manager shall issue written responses to all protests received by the required protest response dates. All protest responses shall be transmitted by first-class U.S. Postal Service to the address indicated in the protest letter. For convenience, Jacksonville Transit will also send a copy of the response to a protest to the Protester by facsimile and/or electronic mail if a facsimile number and/or electronic mail address are indicated in the protest letter. The protest response transmitted by U.S. Postal Service shall be the official Jacksonville Transit response to the protest and Jacksonville Transit will not be responsible for the failure of the Protester to receive the protest response by either facsimile or electronic mail.

20.05 Review of Protests by FTA: All protests involving contracts financed with federal assistance shall be disclosed to the FTA in accordance with FTA Circular 4220.lF. Protesters shall exhaust all administrative remedies with Jacksonville Transit prior to pursuing protests with FTA. FTA limits its reviews of protests to: a grantee's failure to have or follow its protest procedures; a grantee's failure to review a complaint or protest when presented an opportunity to do so; or violations of Federal law or regulation. Appeals to FTA must be received by the cognizant FTA regional or headquarters office within five (5) working days of the date the Protester has received actual or constructive notice of Jacksonville Transit's final decision or within five (5) working days of the date the Protester has identified other grounds for appeal to FTA.

ARTICLE 21 - DISQUALIFICATION OF BIDDERS

21.01 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

ARTICLE 22 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

22.01 All Bids shall remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date.

ARTICLE 23 - EVALUATION OF BIDS AND AWARD OF CONTRACT

23.01 Owner reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, non-responsive, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. Owner also reserves the right to waive any informality not involving price, time or changes in the Work.

23.02 Owner reserves the right to reject any Bid not accompanied by specified documentation.

23.03 Owner reserves the right to reject any Bid that, in its sole discretion, is considered to be unbalanced or unreasonable as to the amount bid for any lump sum or unit price item.

23.04 In evaluating Bids, Owner will consider the qualifications of Bidders, whether or not their Bids comply with the prescribed requirements, the alternatives, if any, the lump sum and unit prices, and other data as may be requested in the Bid Form or prior to the Notice of Award.

23.05 Owner will take into consideration the past performance of the Bidder on construction contracts with particular concern given to completion time, quality of work, cooperation with other contractors, and cooperation with Owner.

23.06 Owner may consider the qualifications and experience of Subcontractors, Suppliers and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers and other

individuals or entities must be submitted as provided in the Supplementary Conditions.

23.07 For determination of the apparent low Bidder, Bids will be compared on the basis of the total of all lump sum and unit price items, unless otherwise noted.

23.08 Discrepancies between words and numerals will be resolved in favor of words. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

23.09 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications and financial ability of the Bidders to perform the Work in accordance with the Contract Documents. Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

23.10 Owner will award the Contract to the lowest responsive and responsible Bidder who has neither been disqualified nor rejected pursuant to Article 20 or this Article 22. The basis of award will be determined by the lowest Base Bid and any or call combinations of the alternates selected by the Owner that was submitted by a responsive and responsible Bidder that does not exceed the amount of funds then estimated by the Owner as available to finance the Contract. If such Bid exceeds such amount, the Owner may reject all Bids or may award the Contact on the Base Bid combined with such deductible alternates, as produces a new amount which is within the available funds.

ARTICLE 24 - CONTRACT SECURITIES

24.01 Performance Bond shall be in the form of Engineers Joint Contract Documents Committee (EJCDC) "Construction Performance Bond", C610. Payment Bond shall be in the form of EJCDC "Construction Payment Bond", C615. The amounts of and other requirements for Performance and Payment Bonds are stated in Paragraph 5.01 of the General Conditions. The requirements for delivery of Bonds are stated in Paragraph 2.01 of the General Conditions. The Bond will be executed by the signing of a Power of Attorney by a Surety legally authorized to do business in North Carolina. Additional requirements may be stated in the Supplementary Conditions.

24.02 Successful Bidder shall within ten days from the date of the Notice of Award deliver to Owner, the Performance Bond and the Payment Bond as stated in 2.01A, 5.01, and 5.02A of the General Conditions.

24.03 Additional information can be found in 20000 FTA Provisions.

ARTICLE 25 - CONTRACTOR'S INSURANCE

25.01 The requirements for Contractor's insurance are stated in Article 5 of the General Conditions and in the Supplementary Conditions. The requirements for delivery of certificates of insurance are stated in Paragraph 2.01 of the General Conditions.

ARTICLE 26 - SIGNING OF AGREEMENT

26.01 When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 10 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner will deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 27 - NOTICE TO PROCEED

27.01 Issuance of the Notice to Proceed shall be as stated in Article 2 of the General Conditions.

ARTICLE 28 - PARTNERING – (Not Used)

ARTICLE 29 – MINORITY BUSINESS CONTRACT PROVISIONS AND FORMS (Not Used)

ARTICLE 30 – APPLICABLE LAW AND FORUM

30.01 Applicable law and forum is identified in the Supplementary Conditions (SC 1.01.A.24).

ARTICLE 31 – E-VERIFY COMPLIANCE PROVISIONS

31.01 North Carolina General Statute §143-133.3 prohibits the City from entering into contracts with contractors and subcontractors who have not complied

with the requirement of Article 2 of Chapter 64 of the North Carolina General Statutes. Contactor shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. Further, if contractor utilizes a subcontractor, contractor shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes.

ARTICLE 32 - IRAN DIVESTMENT ACT CERTIFICATION

32.01 Contractor certifies that, as of the acceptance date of this bid or contract, it is not on the "Final Divestment List" (FDL) or the "Iran Parent and Subsidiary Guidance" (P&S) created by the State Treasurer pursuant to N.C.G.S. § 143-6A-4. In compliance with the requirements of the Iran Divestment Act and N.C.G.S. §143C-6A-5(b), Contractor shall not utilize in the performance of the contract any subcontractor that is identified on the FDL or the P&S. These lists can be found at:https://www.nctreasurer.com/insidethedepartment/OpenGovernment/Pages/Iran-Divestment-Act-Resources.aspx. If at any time Contractor is added to the FDL or the P&S, while under contract with the City of Jacksonville, the City shall have the option to terminate the contract immediately.

Engineer: HR Associates, PA
John W. Farabow, Jr. AIA
2202 Wrightsville Avenue| Suite 212
Wilmington, North Carolina 28403
910.343.6008 x 23

Owner: City of Jacksonville, NC
815 New Bridge St.
Jacksonville, NC 28540

++ END OF INSTRUCTIONS TO BIDDERS ++

00410 BID FORM

Jacksonville Station
Bid No. FY 20-07**A**

TABLE OF ARTICLES

1. Bid Recipient
2. Bidder's Acknowledgements
3. Bidder's Representations
4. Basis of Bid
5. Time of Completion
6. Attachments to this Bid
7. Defined Terms
8. Bid Submittal

ARTICLE 1 - BID RECIPIENT

1.01 This Bid is submitted to:

City Clerk
City of Jacksonville
815 New Bridge Street
Jacksonville, NC 28540

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the price(s) and within the times indicated in this Bid and in accordance with the Bidding Documents and to the entire satisfaction of the City of Jacksonville, N.C. The Bidder understands that no money will be allowed for extra work except as set forth and agreed to in writing, or as specified in the Contract Documents; and further agrees to accept in full compensation therefore the prices named in the attached and initialed schedules and except as otherwise provided in the contract specifications, such prices only.

ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner. Bidder will sign the Agreement and will furnish the required contract security, and other required documents within the time periods set forth in the Bidding Documents.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, if any, and the following Addenda, receipt of all of which is hereby acknowledged.

Addendum No.	Date Received	Addendum No.	Date Received
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

B. Bidder has examined and carefully studied the City of Jacksonville's Manual of Specifications, Standards and Design, most recent revision;

C. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

D. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

E. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions identified at the Site, if any, which that have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

F. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may effect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

G. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

H. Bidder is aware of the general nature of work (if any) to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

I. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents.

J. Bidder has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Owner is acceptable to Bidder.

K. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

3.02 Bidder further represents that:

A. This Bid is genuine and is not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding;

C. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner; and

D. No person or persons acting in any official capacity for the Owner are directly or indirectly interested in this Bid, or in any portion of the profit thereof.

ARTICLE 4 - BASIS OF BID

4.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

The bidder proposes and agrees if this Proposal is accepted to contract with the Owner in the form of contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the contract in complete accordance with the plans, specifications and other contract documents, to the full and entire satisfaction of the Owner, with a definite understanding that no money will be allowed for extra work except as set forth in the General Condition and Contract Documents, for the sum of:

BASE BID:

Written Form:_____

_____Dollars

Numerically: ($_____)

PME BREAKDOWN:

Plumbing Subcontractor:

Name_____

Amount:_____($_____)

Mechanical Subcontractor:

Name_____

Amount:_____($_____)

Electrical Subcontractor:

Name_____

Amount:_____($_____)

ALTERNATES:

Alternate No. One: Under this alternate, provide all general construction changes to overall building envelope including structural related to the NCSBC Category IV classification of the Administration/Transportation Wing as indicated on the drawings.

(ADD)_____Dollars
($_____)

Alternate No. Two: Under this alternate, add all the recycled rubber shingles on the building and the base bid bus canopy, and in lieu of asphalt shingles as shown on the Drawings.

(ADD)_____Dollars
($_____)

Alternate No. Three: Under this alternate, delete 12-inch thick (R-38) insulation batts with metal wire support system and provide minimum 6 1/2-inch thick (R-38) sprayed foam roof insulation as shown on the Drawings.

(ADD)_____Dollars
($_____)

Alternate No. Four: Under this alternate, delete tower manually operated personnel ceiling/soffit access door and provide power-operated (including electrical power circuit) ceiling/soffit access door along with pull-down ladder assembly as shown on the drawings.

(ADD)_____Dollars
($_____)

Alternate No. Five: Under this alternate, add a prefabricated roof skylight over Transit/Operations Wing – Waiting/Ticketing Area #104 as shown on the drawings.

(ADD)_____Dollars
($_____)

Alternate No. Six: Under this alternate, add main bus island canopy including base bid asphalt shingle roof assembly, gutters/downspouts, and associated electrical power and lighting circuits. Concrete column footings, underground

downspout/drainage piping. Conduits for electrical power and lighting, and plumbing are to be included in base bid scope as shown on the Drawings.

(ADD)_____Dollars
($_____)

Alternate No. Seven: Under this alternate, add main bus island canopy including recycled rubber shingle roof assembly, gutters/downspouts, and associated electrical power and lighting circuits. Concrete column footings, underground downspout/drainage piping. Conduits for electrical power and lighting, and plumbing are to be included in base bid scope as shown on the Drawings.

(ADD)_____Dollars
($_____)

UNIT PRICES:

(Unit prices are gross, inclusive of all adjustments, overhead and profit. Ref: Section 01270) Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the scope of the work all in accordance with the contract documents. Owner reserves the right to reject the unit prices if deemed out of line with current cost. If so elected, unit prices will be established at the time of any materials or services to be added or deducted from the Contract Sum.

General earth excavation, machine cu.yd. unit price	($_____)
General earth excavation, hand cu.yd. unit price	($_____)
A615-60, reinforcing in place cu.yd. unit price	($_____)
Offiste Fill, compacted in place ton unit price	($_____)

ARTICLE 5 - TIME OF COMPLETION

5.01 Bidder agrees that the Work will be substantially complete and completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

5.02 Bidder accepts the provisions of the Agreement as to liquidated and special damages in the event of failure to complete the Work within the Contract Times.

ARTICLE 6 - ATTACHMENTS TO THIS BID

6.01 The following documents are attached to and made a condition of this Bid:

I. Bid Security

J. Bidder Qualifications Statement and supporting data

K. Attachment A – Lobbying Certification

L. Attachment B – Buy America Compliance **OR** Attachment C – Buy America Non-Compliance

M. Attachment D – Debarment, Suspension, Ineligibility Certification

N. Attachment E – DBE Utilization Form

O. Attachment F – Intent to Perform as Subcontractor

P. Attachment G – Affidavit of No Change DBE Business

ARTICLE 7 - DEFINED TERMS

7.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders and the General Conditions and Supplementary Conditions.

ARTICLE 8 - BID SUBMITTAL

8.01 This Bid submitted on _____ , 20___ by:

If Bidder is:

An Individual

Name (Typed or Printed): _____

By: _____

(Individual's Signature)

Doing business as: _____

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ Facsimile: _____

A Partnership

Partnership Name: _____

By: _____

(Signature of General Partner - Attach evidence of authority to sign)

(Name (Typed or Printed): _____

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ Facsimile: _____

A Corporation

Corporation Name: _____

_____

(State of Incorporation)

By _____

(Signature - Attach evidence of authority to sign)

Name and Title (Typed or Printed): _____

(CORPORATE SEAL)

Attest: _____

(Secretary)

License or Registration Number: _____

City of Jacksonville
Bid Form Document
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Business Address: _____

_____

Phone No.: _____ Facsimile: _____

Limited Liability Company

By:

_____

(Firm Name)

_____

(State of Formation)

By: _____

(Signature of Member/Authorized to Sign)

_____

(Printed or Typed Name and Title of Member Authorized to Sign)
(Attach evidence of authority to sign.)

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ Facsimile: _____

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____

By: _____

(Signature of First Joint Venturer - Attach evidence of authority to sign)

Name (Typed or Printed): _____

(Title)

Title: _____

Second Joint Venturer Name: _____

By: _____

(Signature of Second Joint Venturer - Attach evidence of authority to sign)

Name (Typed or Printed): _____

(Title)

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation or limited liability company that is a party to the joint venture shall be in the manner indicated above).

Business Address: _____

Phone and FAX number and address for receipt of communications to joint venture:

Phone No.: _____ Facsimile: _____

++ END OF BID FORM ++

00431 BID BOND FORM
(Penal Sum Form)

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable

BIDDER (Name and Address):

_____

SURETY (Name and Address of Principal Place of Business):

_____

OWNER:
City of Jacksonville
815 New Bridge Street
Jacksonville, NC 28540

BID
Bid Due Date:_____

Project: Jacksonville Station

BOND
Bond Number: _____
Date: (Not later than Bid due date): _____
Penal Sum: _____ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	SURETY
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By:_____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest:_____
Signature and Title	Signature and Title

Notes: (1) Above addresses are to be used for giving required notice.

1.0 Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2.0 Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3.0 This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5.0 hereof).

4.0 Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5.0 Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6.0 No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4.0 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7.0 Any suit or action under this Bond shall be construed pursuant to the laws of the State of North Carolina. The State of North Carolina is the proper jurisdiction for all claims and disputes arising under any contract and the proper venue is the Onslow County Superior Court.

8.0 Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9.0 Surety shall cause to be attached to this Bond a current and effective Power or Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.

10.0 This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11.0 The term "Bid" as used herein includes a Bid, offer or proposal as applicable.

++END OF BID BOND++

City of Jacksonville
Bid Bond Form
Jacksonville Station Bid No. FY 20-07**A**

January 2020

00451 BIDDER QUALIFICATIONS STATEMENT

(Completion of this statement is required for consideration for award of Contract.)

SUBMITTED TO:

City Clerk
City of Jacksonville
815 New Bridge Street
Jacksonville, NC 28540

SUBMITTED FOR:

Jacksonville Station
Bid No. FY 20-07**A**

SUBMITTED BY:

Name: _____

(Print or Type Name of Bidder)

(A Corporation/A Partnership/An Individual/A Joint Venture)

[Bidder to circle applicable term]

Address: _____

_____

Telephone No.: _____

Fax No.: _____

Contractors:

The undersigned certifies under oath the truth and correctness of all statements and of all answers to questions made hereinafter and understands that if any statements or answers to questions are adjudged to be untrue, it will be considered grounds for disqualification. Disqualification may prohibit awarding of a City contract to Bidder for a period of five years.

(Note: Attach additional sheets as required.)

1.0 How many years has your organization been in business as a Contractor performing the type of contract work you are bidding on this project?

2.0 How many years has your organization been in business under its present name?

3.0 If a corporation, answer the following:

- 3.1 Date of incorporation:
- 3.2 State of incorporation:
- 3.3 President's name:
- 3.4 Vice-President's name:

4.0 If an individual or partnership, answer the following:

- 4.1 Date of organization:
- 4.2 Name and address of all partners (State whether general or limited partnership)

5.0 If other than corporation or partnership, describe organization and name principals:

6.0 Do you plan to subcontract any part of this project? If so, give details including the name(s) of subcontractors and approximate percentage of total work.

7.0 Over the last 5 years, has any officer (including partners and members) of Bidder (including any experience and time while employed by another firm) been convicted of criminal conduct or been found in violation of any federal, state, or local statute, regulation or court order concerning antitrust, public contracting, or prevailing wages? If the answer to any portion of this question is "yes", furnish details of all such occurrences including nature of violation, name of the owner, architect or engineer, Surety, and name and date of project.

8.0 Over the last 5 years, has Bidder, its parent and/or subsidiaries, or any officer (including partners and members) (including any experience and time while employed by another firm) been barred from bidding on Public or Federal contracts? If the answer to any portion of this question is "yes", furnish details of all such occurrences including, name of the owner, architect or engineer, Surety, and name and date of project.

9.0 Over the last 5 years, has Bidder, its parent and/or subsidiaries, or any officers (including partners and members) (including any experience and time while employed by another firm) has filed for bankruptcy and such filing would materially and adversely affect Bidder's ability to perform the work? If the answer to any portion of this question is "yes", furnish details of all such occurrences.

10.0 Has any construction contract to which Bidder has been a party been terminated by the owner; ever been terminated on a project prior to its completion for any reason; been assessed Liquidated Damages, had any Surety which issued a Performance Bond on Bidders behalf ever completed the work in its own name or financed such completion on Bidder's behalf; had any Surety expended any monies in connection with a contract for which they furnished a bond on Bidder's behalf? If the answer to any portion of this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and Surety, and name and date of project.

11.0 Has any officer or partner of your organization ever been an officer or partner of another

organization that had any construction contract terminated by the owner; terminated work on a project prior to its completion for any reason; been assessed Liquidated Damages, had any Surety which issued a Performance Bond complete the work in its own name or financed such completion; or had any Surety expend any monies in connection with a contract for which they furnished a bond? If the answer to any portion of this question is "yes," furnish details of all such occurrences including name of owner, architect or engineer, Surety, and name and date of project.

12.0 Bidder threatening, or does bidder have pending legal proceeding(s) (including any Federal or State investigation[s]) involving the Bidder, its subsidiaries and/or their respective officers (including partners and members) that may materially and adversely affect the Bidder's ability to perform (including, but not limited to, financial ability) the work?. Are there past legal procedure(s) and judgment(s) including any Federal or State investigation[s]) involving the Bidder, its subsidiaries and/or their respective officers (including partners and members) that may materially and adversely affect the Bidder's ability to perform (including, but not limited to, financial ability) the work? If the answer to any portion of these questions is "yes," furnish details of all such occurrences including name of owner, architect or engineer, Surety, and name and date of project.

13.0 List name of project, owner, architect or engineer, contract amount, percent complete and scheduled completion date of the major construction projects your organization has in progress on this date. All references must be provided with working telephone numbers who are familiar with projects listed.

14.0 List name of project, owner, architect or engineer, contract amount, date of completion and percent of work for projects of similar type and cost of construction as this project which your organization has completed in the last 10 years. List must include at least one federally funded project completed within the last 10 years having a contract value at least 75% of the bid amount of this project and at least 5 municipal or federally funded projects (at least 75% completed) each having a contract value at least 50% of the bid amount for this project. All references must be provided with working telephone numbers who are familiar with projects listed

15.0 List name(s), construction experience and licenses or certifications held by the principal individuals of your organization.

16.0 List all North Carolina construction licenses which are current and valid for your firm. Additionally, list other current and valid construction licensed for other States.

17.0 List name(s), construction experience and licenses or certifications held by the proposed project personnel (i.e., Project Manager and Project Superintendent and Project Foreman) who bidder certifies are available to begin work immediately upon issuance of Notice to Proceed. List must include individuals' experience demonstrating individual was in the proposed role on at least one federally funded project completed within the last 10 years having a contract value at least 75% of the bid amount of this project and at least 5 municipal or federally funded projects (at least 75% completed) each having a contract value at least 50% of the bid amount for this project. All references must be provided with working telephone numbers who are familiar with projects listed.

18.0 List the Bidder's Experience Modification Rate (EMR) for the last 3 years.

19.0 List the Bidder's total and available bonding capacity.

20.0 List name, address and telephone number of an individual who represents each of the following and whom Owner may contact for a financial reference:

20.1 A Surety:

20.2 A Bank: (A signed authorization for deposit and loan account history and rating must also be provided with this submission)

20.3 A major material supplier (provide 2 references):

20.4 A major equipment supplier (provide 2 references):

21.0 Dated this ___ day of _____, 20___.

22.0 Submitted by: _____
(Print or type name of bidder)

By:_____

Seal

_____
(Title)

Bidder: _____
(Print or Type Name of Bidder)

By: _____

_____

Title: _____

City of Jacksonville
BQS and Evaluation
Jacksonville Station Bid No. FY 20-07**A**

January 2020

(Seal, if corporation)

----------(Affidavit for Individual)----------

_____ being duly sworn, deposes and says that:
a) the financial statement, taken from his/her books, is a true and accurate statement of his/her financial condition as of the date thereof; and b) all of the foregoing qualification information is true, complete, and accurate.

----------(Affidavit for Partnership)----------

_____ being duly sworn, deposes and says that:
a) he/she is a member of the partnership of _____;
b) he/she is familiar with the books of said partnership showing its financial condition; c) the financial statement, taken from the books of said partnership, is a true and accurate statement of the financial condition of the partnership as of the date thereof; and d) all of the foregoing qualification information is true, complete, and accurate.

----------(Affidavit for Corporation)----------

_____ being duly sworn, deposes and says that: a) he/she is _____ of _____;
(Full name of Corporation)
b) he/she is familiar with the books of said corporation showing its financial condition; c) the financial statement, taken from the books of said corporation, is a true and accurate statement of the financial condition of said corporation as of the date thereof; and d) that all of the foregoing qualification information is true, complete, and accurate.

---------- (Acknowledgment) ----------

_____ being duly sworn, deposes and says
that he/she is _____ of _____;
(Name of Bidder)
that he/she is duly authorized to make the foregoing affidavit and that he/she makes it on behalf of
( ) himself/herself; ( ) said partnership; ( ) said corporation.

Sworn to before me this _____ day of _____, 20__, in the County of _____, State of _____.

_____
(Notary Public)

My commission expires _____

(Seal)

++END OF BIDDER QUALIFICATIONS STATEMENT++

City of Jacksonville
BQS and Evaluation
Jacksonville Station Bid No. FY 20-07**A**

January 2020

ATTACHMENT A
BIDDER QUALIFICATIONS EVALUATION CRITERIA

This document supplements the Bidder Qualification Statement and provides information to assist interested Bidder in preparing their qualifications statement required to be submitted with their bid. The Owner will qualify Bidders for all Construction Contracts prior to award of contract. The criteria listed in this document, the Bidder Qualification Statement, and information obtained through reference checks will be used by the Owner to determine whether a Bidder is qualified to be awarded a contract by the Owner. The criteria contained herein establish the minimum requirements to be considered for qualification. All questions and requests for information in the Bidder Qualification Statement must be completed.

The Owner reserves the right to reject any non-conforming or all Bidder Qualification Statements; to determine whether a minor deviation from an evaluation criteria is insignificant considering all relevant information; waive technicalities and informalities; and/or require the submission of additional information or documentation.

1.0 Bidder's General Business Information (Bidder Qualifications Statement Items 1 – 5)

Interested Bidders must complete all applicable sections.

2.0 Work performed by others (Bidder Qualifications Statement Item 6).

Interested Bidders must identify subcontractors planned for use on this project. Include subcontractor name, type of work to be performed and approximate total percentage of total work to be performed by subcontractors.

3.0 Legal Evaluation Criteria (Bidder Qualifications Statement Items 7 – 12).

The following legal criteria will be used to evaluate the Bidder Qualifications Statement:

3.1 Over the last 5 years, if any officer (including partners and members) of Bidder (including any experience and time while employed by another firm) has been convicted of criminal conduct or been found in violation of any federal, state, or local statute, regulation or court order concerning antitrust, public contracting, or prevailing wages, this will be considered grounds for disqualification.

3.2 Over the last 5 years, if Bidder, its parent and/or subsidiaries, or any officer (including partners and members) (including any experience and time while employed by another firm) has been barred from bidding on Public or Federal contracts, this will be considered grounds for disqualification.

3.3 Over the last 5 years, if Bidder, its parent and/or subsidiaries, or any officers (including partners and members) (including any experience and time while employed by another firm) has filed for bankruptcy, and such filing would materially and adversely affect Bidder's ability to perform the work, this will be considered grounds for disqualification.

3.4 Over the last 5 years, if Bidder, has had any contract terminated by the owner; has had work terminated on a project prior to its completion for any reason; been assessed Liquidated Damages for project delays; has had any Surety which issued a Performance Bond on its behalf ever completed the work in its own name or financed such completion on Bidder's behalf; or if

any Surety expended any monies in connection with a contract for which they furnished a bond on Bidder's behalf will be considered grounds for disqualification.

3.5 Over the last 5 years, if any officer or partner of Bidder's organization ever been an officer or partner of another organization that had any contract terminated by the owner; has had work terminated on a project prior to its completion for any reason; been assessed Liquidated Damages for project delays; has had any Surety which issued a Performance Bond ever completed the work in its own name or financed such completion; or if any Surety expended any monies in connection with a contract for which they furnished a bond will be considered grounds for disqualification.

3.6 If threatened or pending legal proceeding(s) (including any Federal or State investigation[s]) involving the Bidder, its subsidiaries and/or their respective officers (including partners and members) are adversely resolved, such threatened or pending proceeding(s) must not materially and adversely affect the Bidder's ability to perform (including, but not limited to, financial ability) the work. Past legal proceeding(s) and judgment(s) (including any Federal or State investigation[s]) involving the Bidder, its subsidiaries and/or their respective officers (including partners and members) must not materially and adversely affect the Bidder's ability to perform (including, but not limited to, financial ability) the work.

4.0 Similar Project Experience (Bidder Qualifications Statement Items 13 - 14).

4.1 Interested Bidders shall provide general information requested related to construction projects currently in progress on this date.

4.2 Interested Bidders must demonstrate experience in completing projects of similar type and costs of construction as this project during the last 10 years. Projects submitted must include at least one federally funded project completed within the last 10 years having a contract value at least 75% of the bid amount of this project and at least 5 municipal or federally funded projects (at least 75% completed) each having a contract value at least 50% of the bid amount for this project.

4.3 A pattern of not completing work on schedule and/or a pattern of assessment of Liquidated Damages on projects in progress as reported by reference contacts will be grounds for disqualification. A pattern of rework necessary to correct work not in accordance with specified quality as reported by reference contracts will be grounds for disqualification.

4.4 If it is determined that reference contacts listed are not representative or knowledgeable of required experience, The City of Jacksonville reserves the right to contact references in addition to those listed and use those references in the qualification process.

5.0 Licenses and Certifications (Bidder Qualifications Statement Items 15 & 16).

5.1 In order to be considered for qualification, interested Bidders must be properly licensed in the State of North Carolina in the particular contract area of interest. Bidder shall list all licenses they hold that apply to the contract area of interest.

6.0 Experience of Proposed Project Personnel (Bidder Qualifications Statement Item 17).

6.1 Interested Bidders must provide all experience, license, and certification information requested.

6.2 The Project Manager and/or Project Superintendent and/or Project Foreman proposed for the project must be available to begin work immediately upon issuance of the Notice to Proceed. Reference contacts listed must have working telephone numbers and must be familiar with the projects listed on the statement.

6.3 In order to be considered for qualification, Project Manager and Project Superintendent and Project Foreman must list and have the following minimum qualifications:

a. At least one federally funded project completed within the last 10 years having a contract value at least 75% of the bid amount of this project and at least 5 municipal or federally funded projects (at least 75% completed) each having a contract value at least 50% of the bid amount for this project.
b. Reference contacts (including name and telephone number) must be provided for the referenced projects. Record of request (as determined from reference contacts) to remove proposed individual(s) from on-going or previous projects will be grounds for disqualification. A pattern of not completing work on schedule and/or rework necessary to correct work not meeting specified quality (as determined through reference checks) will be grounds for disqualification.

7.0 Bidder Experience Modification Rate (Bidder Qualifications Statement Item 18).

7.1 In order to be considered for qualification, Bidder's Experience Modification Rate (EMR) for the last 3 years must not exceed 1.0.

8.0 Financial (Bidder Qualifications Statement Items 19 & 20).

8.1 Interested Bidders must list their <u>total</u> **and** <u>available</u> bonding capacity

8.2 Interested Bidders must provide name, address, and telephone numbers of their Surety Company for Owner to use as a reference check for stated bonding capacity and availability.

8.3 Interested Bidders must provide name, address and telephone number(s) of their Bank in addition to a signed authorization for deposit and loan account history and rating to be provided to the Owner as a reference check for their stated financial information at the time of Bidding.

8.4 Interested Bidders must provide name, address and telephone numbers for at least 2 major equipment and 2 major material suppliers that Owner may use as financial references. A pattern of failure to honor contractual commitments with suppliers on a timely basis will be grounds for disqualification.

8.5 In order to be considered for qualification, interested Bidders may be asked to submit audited financial statements for the last 3 years and must comply with this request.

9.0 Bidder Qualifications Statement Execution (Bidder Qualifications Statement Items 21 & 22).

9.1 Interested Bidders must date, execute, and have notarized, the Bidder Qualifications Statement as indicated.

00521 AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ in the year _____, by and between the City of Jacksonville (hereinafter called Owner) and _____ (hereinafter called Contractor).

WITNESSETH: Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall at its own cost and expense furnish all supervision, labor, services, tools, materials, equipment and incidentals necessary to complete all Work as specified or indicated in the Contract Documents to construct the Jacksonville Station. The Work is generally described in Section 01010.

ARTICLE 2 - PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Construction of a new bus transit facility with an approximately 15,000 square foot transit/administration building and associated bus unloading/loading area.

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by HR Associates, PA, who is hereinafter called Engineer and who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within **Three Hundred Sixty Five (365)** days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **Three Hundred Ninety Five (395)** days from the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. Owner and Contractor recognize that time is of the essence of this Agreement and Owner will suffer financial loss, apart from the costs described in Paragraph 4.04.A, if the Work is not substantially completed within the time specified in Paragraph 4.02.A for Substantial Completion, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Owner and Contractor also recognize the delays, expense and difficulties involved in proving in a legal or mediation proceeding the actual loss suffered by Owner if the Work is not substantially completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner **Seven Hundred Dollars ($700.00)** for each day that expires after the time specified in Paragraph 4.02.A for Substantial Completion (adjusted for any changes thereof made in accordance with Article 12 of the General Conditions) until the Work is substantially complete.

4.04 Special Damages

A. In addition to the amount provided for liquidated damages, Contractor shall pay OWNER the actual costs reasonably incurred by Owner for engineering and inspection forces employed for the Work for each day that expires after the days specified in Paragraph. 4.02.A for Substantial Completion (adjusted for any changes thereof made in accordance with Article 12 of the General Conditions) until the Work is substantially complete.

B. After Substantial Completion, if Contractor shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner the actual costs reasonably incurred by Owner for engineering and inspection forces employed for the Work for each day that expires after the time specified in Article 3 for Work to be completed and ready for final payment (adjusted for any extensions thereof made in accordance with Article 12 of the General Conditions) until the Work is completed and ready for final payment.

4.05 Owner may deduct liquidated damages and special damages as determined by the provisions of this Article 4 from progress payments due Contractor under this Agreement.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor, in current funds, for completion of the Work in accordance with the Contract Documents the prices stated in Contractor's Bid to include any alternates that may have been selected, which Bid is attached hereto and identified as Exhibit 1 of this Agreement. As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make monthly progress payments on account of the Contract Price on the basis of

Contractor's Applications for Payment as recommended by Engineer. Contractor's Applications for Payment will be due on the 10th day of the month. All progress payments will be on the basis of the progress of the Work measured by the schedule of values provided for in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work, based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements. A progress payment will not be made whenever the value of the Work completed since the last previous progress payment is less than $5,000.00.

1. The following Section is a synopsis of the GS. 143-134.1 regarding withholding retainage from the Contractor. The Contractor is responsible for abiding by this law while under contract with Owner.

    a. Prior to Fifty Percent (50%) Project Completion

    To ensure proper performance of the Contract, the Owner will retain five percent (5%) of the amount of each approved pay application until the project work is 50% complete provided that the Contractor continues to perform satisfactorily as determined by the Owner and any non-conforming work identified in writing by the Owner prior to that date has been corrected by the Contractor and accepted by the Owner.

    The project shall be deemed fifty percent (50%) complete when the Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the value of the contract, except the value of materials stored on-site shall not exceed twenty percent (20%) of the contractor's gross project invoices for the purpose of determining whether the project is fifty percent (50%) complete.

    The Owner will release four and one-half percent (4.5%) of the five percent (5%) of the retainage held by the Owner for the work completed by any Subcontractor whose trade is identified in the Supplementary Conditions and whose work has reached one hundred percent (100%) complete by or before the project is fifty percent (50%) complete. Release of the retainage will be contingent upon satisfactory performance of the Subcontractor, Owner’s receipt of a certification from the Engineer that the work performed by the subcontractor is acceptable and in accordance with the Contract Documents, and written consent of the Surety.

    b. At Fifty Percent (50%) Project Completion to Substantial Completion

    The Owner with written consent of the Surety, will not retain any further retainage from periodic payments due the Contractor if the Contractor continues to perform satisfactorily and any nonconforming work identified in writing prior to that time by the Engineer and Owner has been corrected by the Contractor and accepted by the Engineer and Owner.

    If the Owner determines the Contractor’s performance is unsatisfactory, the Owner may reinstate retainage for each subsequent periodic payment application up to the maximum amount of five percent (5%).

    c. Substantial Completion until Final Completion

Within 60 days after the submission of a pay request and one of the following occurs, the Owner with written consent of the Surety shall release to the Contractor all retainage on payments held by the Owner:

- The Owner receives a certificate of Substantial Completion from the Engineer.
- The Owner receives beneficial occupancy or use of the project.

However, the Owner may retain sufficient funds to secure completion of the project or corrections on any work. If the Owner withholds funds, the amount retained shall not exceed two and one-half times the estimated value of the work to be completed or corrected.

The existence of any third-party claims against the Contractor or any additive Change Orders to the Construction Contract shall not be a basis for delaying the release of any retainage on payments.

2. No retainage can be withheld from any subcontractor as stated in FTA 20000 Provisions.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due hereunder shall bear interest at one percent per month.

ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS

8.01 As part of the inducement for Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has examined and carefully studied the City of Jacksonville's Manual of Specifications, Standards and Design, most recent revision;

C. Contractor has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

D. Contractor is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

E. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition identified at the Site, if any, which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

F. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site

which may effect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents to be employed by Contractor, and safety precautions and programs incident thereto.

G. Contractor does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the performance of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

H. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

I. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

J. Contractor has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

K. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 The Contract Documents consist of the following:

A. Agreement
B. Certificate of Attorney and Finance Director
C. Notice of Award
D. Notice to Proceed (to be executed)
E. Advertisement for Bid
F. Instructions to Bidders
G. Construction Contract Progress Payment Requests
H. Sales Tax Affidavit
I. Sales Tax Listing
J. Contract/Purchase Order Change Request
L. Surety's Consent to Discontinue Withholding Retainage
M. Affidavit of Payment of Taxes, Labor and Materials
N. Contractor's Final Release (to be executed)
O. General Conditions
P. Supplementary Conditions
Q. Senate Bill 914 Dispute Resolution
R. Technical/Building Specifications
S. Bid Form
T. Bid Bond
U. Insurance Certificate
V. Performance Bond
W. Payment Bond
X. Specifications, as listed in the table of contents of the Project Manual

Y. The Drawings comprising a set entitled "Jacksonville Station", dated June 10, 2019, and including the following:

COVER
- G1 BUILDING CODE SUMMARY
- G2 LIFE SAFETY PLAN, ENERGY CODE DATA COMCHECK

CIVIL/SITE
- C1.0 OVERALL SITE PLAN
- C1.1 EXISTING CONDITIONS PLAN
- C1.2 SITE PLAN
- C1.3 OVERALL DRAINAGE AND EROSION CONTROL PLAN
- C1.4 SITE GRADING PLAN
- C1.5 OVERALL WATER AND SEWER PLAN
- C1.6 ROOF DRAINAGE PLAN
- C1.7 SEWER MAIN PLAN AND PROFILE PLAN
- C1.8 STORM WATER POND DETAIL SHEET
- C1.9 TURN LANE PLAN
- C1.10 SITE DETAIL SHEET
- C1.11 WATER AND SEWER DETAIL SHEET

CIVIL/ARCHITECTURAL
- CA.1 ARCHITECTURAL PARTIAL SITE PLAN
- CA.2 SITE DETAILS
- CA.3 SITE SIGN DETAILS

CITY/LANDSCAPE
- L1.0 LANDSCAPE PLAN
- L1.1 LANDSCAPE PLAN
- L1.2 LANDSCAPE PLAN
- L1.3 LANDSCAPE PLAN
- L1.4 LANDSCAPE NOTES & DETAILS

STRUCTURAL
- S1.0 TYPICAL NOTES & DETAILS
- S1.1 TYPICAL DETAILS
- S1.2 (ALTERNATE NO. ONE) SPECIAL INSPECTIONS
- S2.1 PARTIAL FOUNDATION PLAN
- S2.2 PARTIAL FOUNDATION PLAN
- S2.3 CANOPY FOUNDATION PLAN
- S2.4 AGGREGATE PIER PLAN (REFERENCE ONLY)
- S3.1 PARTIAL ROOF FRAMING PLAN
- S3.2 PARTIAL ROOF FRAMING PLAN
- S3.3 CANOPY FRAMING PLAN
- S4.1 SECTIONS
- S4.2 SECTIONS

ARCHITECTURAL
- A1.1 OVERALL BUILDING FLOOR PLAN
- A1.2 OVERALL BUS ISLAND PLAN
- A2.1 FLOOR PLAN - TRANSIT / OPERATIONS WING
- A2.2 FLOOR PLAN - TRANSIT / OPERATIONS WING LAYOUT
- A2.3 FLOOR PLAN - TRANSPORTATION / ADMINISTRATION WING
- A2.4 FLOOR PLAN - TRANSPORTATION / ADMINISTRATION WING LAYOUT
- A2.5 COLUMN / WALL DETAILS
- A3.1 ATTIC PLAN - BUILDING/TOWER
- A3.2 ROOF PLAN - BUILDING

A3.3 ROOF PLAN - BUS ISLAND
A4.1 EXTERIOR ELEVATIONS - BUILDING
A4.2 EXTERIOR ELEVATIONS - PASSAGEWAY & GREYHOUND CANOPY
A4.3 (ALTERNATE NO. SIX) EXTERIOR ELEVATIONS - BUS CANOPY
A5.1 EXTERIOR TOWER SECTION
A5.2 EXTERIOR PASSAGEWAY SECTION
A5.3 EXTERIOR GREYHOUND LOADING CANOPY SECTION
A5.4 EXTERIOR PEDESTRIAN CROSSWALK SECTION
A5.5 (ALTERNATE NO. SIX) EXTERIOR BUS ISLAND / CANOPY SECTION
A6.1 WALL SECTIONS / TYPICAL
A6.2 WALL SECTIONS / DOOR
A6.3 WALL SECTIONS
A6.4 WALL SECTIONS
A6.5 WALL SECTIONS
A7.1 EXTERIOR DETAILS - BUILDING
A7.1A (ALTERNATE NO. ONE) EXTERIOR DETAILS - BUILDING
A7.2 EXTERIOR DETAILS - TOWER
A7.3 EXTERIOR DETAILS - WINDOW / DOOR / STUCCO DETAILS
A7.3A (ALTERNATE NO. ONE) WINDOW/DOOR DETAILS
A8.1 WINDOW/DOOR ELEVATIONS
A9.1 DOOR / DOOR HARDWARE SCHEDULE / SPECIFICATIONS
A9.2 DOOR SCHEDULE/DETAILS
A9.3 ROOM FINISH / COLOR SCHEDULES
A10.1 TOILET PLANS
A10.2 TOILET ELEVATIONS/DETAILS
A11.1 REFLECTED CEILING PLAN - TRANSIT / OPERATIONS WING
A11.2 REFLECTED CEILING PLAN - TRANSPORTATION / ADMINISTRATION WING
A12.1 MILLWORK / ELEVATIONS
A12.2 MILLWORK / ELEVATIONS
A12.3 MILLWORK / ELEVATIONS
A12.4 MILLWORK SECTIONS / DETAILS
I.1 WAITING ROOM ELEVATIONS
I.2 PUBLIC MEETING ROOM ELEVATIONS
I.3 FURNITURE PLAN - TRANSIT / OPERATIONS WING (FOR REFERENCE ONLY)
I.4 FURNITURE PLAN - TRANSPORTATION / ADMINISTRATION WING (FOR REFERENCE ONLY)
I.5 ROOM SIGNAGE PLAN

PLUMBING

P0.1 PLUMBING LEGEND, NOTES AND SCHEDULES
P2.1 PLUMBING FLOOR PLAN - TRANSIT / OPERATIONS WING
P2.2 PLUMBING FLOOR PLAN - TRANSPORTATION / ADMINISTRATION WING
P2.3 PLUMBING FLOOR PLAN - EXTERIOR CANOPY
P3.1 PLUMBING ROOF PLAN - TRANSIT / OPERATIONS WING
P3.2 PLUMBING ROOF PLAN - TRANSPORTATION / ADMINISTRATION WING
P4.1 ENLARGED PLUMBING PLAN - WATER
P4.2 ENLARGED PLUMBING PLAN - WASTE & GAS
P4.3 ENLARGED PLUMBING PLAN - WATER RISERS
P4.4 ENLARGED PLUMBING PLAN - WASTE & VENT RISERS

MECHANICAL

M0.1 MECHANICAL LEGEND, NOTES AND SCHEDULES
M0.2 MECHANICAL DETAILS & SCHEDULES
M.03 MECHANICAL DETAILS
M.04 MECHANICAL SEQUENCE OF OPERATION

M2.1 MECHANICAL FLOOR PLAN - TRANSIT / OPERATIONS WING
M2.2 MECHANICAL FLOOR PLAN - TRANSPORTATION / ADMINISTRATION WING
M3.1 MECHANICAL ROOF PLAN - TRANSIT / OPERATIONS WING
M3.2 MECHANICAL ROOF PLAN - TRANSPORTATION / ADMINISTRATION

ELECTRICAL

E0.1 ELECTRICAL LEGEND, NOTES AND SCHEDULES
E0.2 ELECTRICAL DETAILS
E2.1A ELECTRICAL FLOOR PLAN - TRANSIT / OPERATIONS WING - LIGHTING
E2.1B ELECTRICAL FLOOR PLAN - TRANSIT / OPERATIONS WING - POWER
E2.2A ELECTRICAL FLOOR PLAN - TRANSPORTATION / ADMINISTRATION - LIGHTING
E2.2B ELECTRICAL FLOOR PLAN - TRANSPORTATION / ADMINISTRATION WING - POWER
E2.3A ELECTRICAL FLOOR PLAN - EXTERIOR CANOPY - LIGHTING
E2.3B ELECTRICAL FLOOR PLAN - EXTERIOR CANOPY - POWER
E3.1 ELECTRICAL ROOF PLAN - TRANSIT / OPERATIONS WING
E3.2 ELECTRICAL ROOF PLAN - TRANSPORTATION / ADMINISTRATION WING
E4.1 ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES
E4.2 ELECTRICAL PANEL SCHEDULES

Z. Addenda consisting of Numbers____ to ____, inclusive.

AA Exhibits to the Agreement enumerated as follows:

1. ~~Exhibit 1, (1) (___ pages).~~ **N / A**

BB. The following, which may be delivered or issued on or after the Effective Date of the Agreement, and are not attached hereto:

1. Notice to Proceed

2. Work Change Directives

3. Change Order(s)

9.02 The documents listed in Paragraph 9.01 above are attached to this Agreement (except as expressly noted otherwise above). Documents not attached are incorporated by reference.

9.03 The Contract Documents may only be amended or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings indicated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law),

and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents, held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Waiver

A. The waiver by the Owner of any breach or violation of any term, covenant, or condition of this Agreement or of any Law or Regulation shall not be deemed to be a waiver of any other term, covenant, condition, or Law or Regulation or of any subsequent breach or violation of the same or of any other term, covenant, condition, or Law or Regulation. The subsequent payment of any monies or fee by the Owner which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by Contractor of any term, covenant or condition of this Agreement or of any applicable Law or Regulation.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement on the day and year first written above.

This Agreement will be effective on _____, 20___ (which is the Effective Date of the Agreement).

Owner: City of Jacksonville	Contractor: _____
By: _____	By: _____
Richard L. Woodruff	
Title: City Manager	Title: _____
[CORPORATE SEAL]	[CORPORATE SEAL]
Attest _____	Attest _____
Title: City Clerk	Title: _____
Address for giving notices	Address for giving notices
815 New Bridge Street	_____
PO Box 128	_____

City of Jacksonville
Agreement
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Jacksonville, NC 28541

Email Address (please print clearly)

(If Owner is a corporation, partnership, or limited liability company, attach evidence of authority to sign) (If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Agreement.)

Designated Representative:

Name: Deanna Trebil

Title: MPO Administrator

Address: 815 New Bridge St.

Phone No.: (910) 938-5073

Fax No.: _____

Email Address (please print clearly)

License No. _____
(where applicable)

Agent for service of process:_____

_____

(If Contractor is a corporation, partnership, or limited liability company, attach evidence of authority to sign.)

Designated Representative:

Name: _____

Title: _____

Address: _____

Phone No.: _____

Fax No.: _____

CERTIFICATE OF CITY'S ATTORNEY

I, the undersigned, John T. Carter Jr., the duly authorized and acting legal representative of THE CITY OF JACKSONVILLE, NORTH CAROLINA, do hereby certify as follows:

I have examined the attached Contract Jacksonville Station Bid No. FY 20-07**A** submitted by _____, and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legal binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

_____
Signature

_____
Date

APPROVAL BY CITY FINANCE OFFICER

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

Account #: _____(_____)

_____
Signature

Contract Amount: $_____

_____
Date

++END OF AGREEMENT++

City of Jacksonville
Agreement
Jacksonville Station Bid No. FY 20-07**A**

January 2020

RFB- Jacksonville Station Re-Bid
Bid No. FY20-07A
City of Jacksonville, NC
Page 59 of 894

00610 PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
City of Jacksonville
815 New Bridge Street
Jacksonville North Carolina 28540

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

EJCDC No. C-610 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;

2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or

2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Representative (engineer or other party)

00615 PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
City of Jacksonville
815 New Bridge Street
Jacksonville North Carolina 28540

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

EJCDC No. C-615 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative (engineer or other par

CITY OF JACKSONVILLE, NORTH CAROLINA

00710 STANDARD GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT

City of Jacksonville, North Carolina
Standard General Conditions
Jacksonville Station

October 2019

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda* - Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement* - The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment* - The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos* - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid* - The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder* - The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents* - The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements* - The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order* - A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim* - A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract* - The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents* - Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price* - The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times* - The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor or CONTRACTOR* - The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work* - See Paragraph 11.01.A for definition.

17. *Drawings* - That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement* - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer or ENGINEER* - The individual or entity named as such in the Agreement.

20. *Field Order* - A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements* - Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition* - The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste* - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations* - Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens* - Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone* - A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award* - The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed* - A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner or OWNER – City of Jacksonville, North Carolina, acting through the appropriate department, official, or City Council.*

30. *PCBs* - Polychlorinated biphenyls.

31. *Petroleum* - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule* - A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project* - The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual* - The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material* - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* - An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative* - The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples* - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals* - A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values* - A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings* - All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site* - Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications* - That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

44. *Subcontractor* - An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion* - The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder* - The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions* - That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier* - A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities* - All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work* - Work to be paid for on the basis of unit prices.

51. *Work* - The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive* - A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall

not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds and Certificates of Insurance as Contractor may be required to furnish.

B. *Evidence of Insurance:* Contractor shall deliver to the Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance which Contractor is required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to three printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the Ninety day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. It is the intent of the Contract Documents to secure for the Owner a Project to be constructed at a total cost not to exceed the total Contract Price based on Contract quantities. The project budget will be established on this basis. Pursuant to this, should the Contractor anticipate any possibilities of a Change Order or Change Orders which would result in an increase of the total Contract Price, s/he shall immediately contact the Owner or Engineer and advise him/her of such anticipated increases.

D. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Owner and Engineer any conflict, error, ambiguity, or discrepancy which

Contractor may discover and shall obtain a written interpretation or clarification before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Owner and Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. a Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except

for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Subsurface Obstructions: Care shall be taken not to injure any gas, water, sewer, storm drain, or any other service pipes connected therewith or electric or communication conduits or other underground structures. The Contractor shall repair or have repaired at once, at his/her own cost, any public or private structure damaged by or in the course of his/her work. The Owner reserves the right to repair with its own forces any damage done to sewer mains, water mains, storm drain pipes, or connections thereto, hydrants, valves, or other structures belonging to the Owner. If the Owner exercises this right, s/he will make all necessary repairs, allowing the Contractor full opportunity for inspecting and checking the cost of the work, and will deduct the actual cost thereof from any money due or to become due to the Contractor. These repairs, whether accomplished by the Contractor or the Owner, shall include everything necessary to restore the damaged structure to as good condition in all respects as prior to the Contractor's work. This may include the use of foundation material where none had been used before or different materials or types of construction from the original if these should be necessary to provide a new structure as stable and substantial as the one damaged.

1. Should the location or position of any gas line, water pipe, sewer main, storm drain, conduit or other obstruction be such that it conflicts in line and grade with the pipe or structure being installed

under this contract, or conflicts otherwise so as, in the opinion of the Engineer, to require its removal, realignment or change will be made without expense to the Contractor. When, however, such gas line, water pipe, or other obstruction shall come within the limits of the excavation for the work as located by the Engineer, such pipe, conduit, or other obstruction shall be constituting a part of his/her work in excavating. No claim for damages or extra compensation shall accrue to the Contractor from the presence of such pipe or other obstruction or from any delay due to its removal or rearrangement.

2. In case any pipe or other obstruction so located as to interfere with the work is unexpectedly encountered, the Contractor shall immediately notify the Engineer of the locality and circumstances and the place shall be passed over until satisfactory arrangements for avoiding the conflict are made without any claim for damages arising from the delay.

3. The Owner's representative will in all cases be the judge of the necessity or expediency of any change or rearrangement of any underground structures that may interfere with the construction of the work.

4. The Contractor shall take all risks and be responsible for all expense and damage attending the presence or proximity of any gas line, water pipes, sewer mains, storm drains, conduits, or other underground structures where such pipes or other structures cross or appear in such a manner as not to demand their rearrangement or realignment.

5. The Owner or the Engineer is under no obligation to inform the Contractor nor to show on the Drawings the presence or the location of any obstacles either on the surface or underground; the Contractor shall make his/her own investigations. Such information shown on the Drawings or furnished otherwise to the Contractor shall not be construed as a waiver of the Contractor's liability, but rather as an attempt on the part of the Engineer or the Owner to minimize the Contractor's hazards.

D. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference* Points

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until eighteen months after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. Please see https://www.fiscal.treasury.gov/fsreports/ref/suretyBnd/c570_a-z.htm for further information regarding qualified surety companies. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

D. Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their Power-of-Attorney.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized by the federal government in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided herein or in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

5.04 *Insurance Requirements*

A. The Contractor shall not commence work under this Contract until s/he has obtained all insurance required, and such insurance has been approved in writing by the Owner, nor shall the Contractor allow any subcontractor to commence work on his/her subcontract until all similar insurance required of the subcontractor has been so obtained and similarly approved by the Owner.

B. Amend all appropriate provisions to agree with the following insurance requirements. The City and Engineer shall be listed as additional insureds on comprehensive General Liability and Business Automobile Liability policies. All such insurance shall be in form and substance satisfactory of Owner, and shall be maintained with responsible insurance carriers licensed to do business in the State of North Carolina. The limits of insurance listed below are minimum limits required to be provided by Contractor. See Supplementary Conditions for any other project specific limits required.

1. Comprehensive Automobile Liability. The liability limits shall be as noted in the Supplementary Conditions. This insurance shall be written in comprehensive form and shall protect the Contractor against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired.

2. Comprehensive General Liability. The liability limits shall be as noted in the Supplementary Conditions. This insurance shall be written in comprehensive form and shall protect the Contractor against all claims arising from injuries to persons other than his/her employees or damage to property of the Owner or others arising out of any act or omission of the Contractor or his/her agents, employees or subcontractors. The policy shall also include protection against claims insured by usual Personal Injury Liability Coverage, a "Protective Liability" endorsement to insure the contractual liability assumed by the Contractor under the indemnification provisions in General Conditions, and "Completed Operations and Products Liability" Coverage (to remain in force during the correction period).

3. To the extent that the Contractor's work, or work under his/her direction, may require blasting, explosive conditions, or underground operations, the Comprehensive General Liability coverage shall contain no exclusion relative to blasting, explosion, collapse of buildings, or damage to underground property.

4. Umbrella Liability. The liability limits shall be as noted in the Supplementary Conditions. This insurance shall protect the Contractor against all claims in excess of the limits provided under the Worker's Compensation and Employer's Liability, Comprehensive Automobile Liability, and General Liability Policies.

5. Worker's Compensation. The Contractor shall take out and maintain during the life of this Contract, Worker's Compensation Insurance for all employees employed at the site of the project

under this Contract. The coverage must include employers' liability with a limit no less than the minimum required by North Carolina State Statute.

6. Builder's Risk All-Risk Insurance. The Contractor shall secure and maintain during the life of this Contract, Builder's Risk All-Risk Insurance, including fire and extended coverage, wind and water damage from hurricanes and tropical storms, flooding, and special extended coverage, for 100% of the Contract amount. The coverage should provide for losses to be paid to the Contractor and the Owner as their interests may appear.

7. Proof of Carriage. The Contractor shall within 10 days of receiving the Notice of Award, provide the Owner with original certificates of all insurance (copies/faxes are not acceptable), each with substantially the following notation or endorsement: "Written notice of cancellation, expiration, nonrenewal or changes in coverage, during the full period of construction covered by this Contract, shall be given to the City of Jacksonville ten (30) days prior to the date of such cancellation, expiration, nonrenewal, lapse of coverage, or changes in coverage affecting this Policy."

8. The Contractor shall furnish such additional insurance as may be required by the General Statutes of North Carolina, including motor vehicle insurance in amounts not less than statutory limits.

5.05 *Waiver of* Rights

A. Owner and Contractor intend that all policies purchased will protect Owner, Contractor, Subcontractors, Engineer, to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, Engineer, and all other individuals or entities identified in Paragraph 5.04 to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

5.06 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.04 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

5.07 *Acceptance of Bonds and Insurance; Option to Replace*

A. If Owner has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the Owner shall so notify the Contractor in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Contractor shall provide such additional information in respect of insurance provided as the Owner may reasonably

request. If Contractor does not purchase or maintain all of the bonds and insurance required by the Contract Documents, Contractor shall notify the Owner in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the Owner may elect to obtain equivalent bonds or insurance to protect Owner's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours between Sunrise and Sunset. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

C. At any time during the construction and completion of the Work covered by the Contract Documents, if the conduct of any worker of the various crafts be adjudged unprofessional and a nuisance to the Owner or Engineer, the Contractor shall order such parties removed immediately from the grounds.

D. During the performance of this Contract, the Contractor agrees to abide by Federal and local regulations pertaining to equal employment opportunity. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

E. Maintenance and cleanup activities may be performed during hours other than regular working hours provided that such activities do not require the startup or operation of construction equipment.

F. If it shall become absolutely necessary to perform Work at night or on Saturdays, Sundays or legal holidays, written notice shall be submitted to Owner and Engineer at least 48 hours in advance of the need for such Work. Owner will only consider the performance of such Work as can be performed satisfactorily under the conditions. Good lighting and all other necessary facilities for carrying out and observing the Work shall be provided and maintained where such Work is being performed at night.

6.03 *Services, Materials, and Equipment*

A. The Contractor shall, unless otherwise specified, supply all labor, transportation, materials, tools, apparatus, lights, power, heat, sanitary facilities, water, scaffolding, and incidentals necessary for the entire proper and substantial completion of the Work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper, and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown in the plans, stated in the specifications, or reasonably implied therefrom, all in accordance with the Contract Documents.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

D. Before ordering materials or doing any work, each Contractor shall verify all measurements at the Site and shall be responsible for the correctness of such measurements. No extra charge will be allowed on account of differences between actual dimensions and the measurements indicated in the Contract Documents. Any difference which may be found shall be submitted to the Engineer for consideration before proceeding with the Work.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. In accordance with Chapter 133 of the General Statutes of North Carolina, any request for substitutes or "or-equals" shall be submitted prior to the opening of Bids and in accordance with the schedule provided in Article 13 of the Instructions to Bidders.

B. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. "*Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case

review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.B.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics,

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.B.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.B.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services,

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

C. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.B.2.

D. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.B and 6.05.C. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

E. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

F. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.B.2 and 6.05.C. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

G. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Unless otherwise provided in the Supplementary Conditions, the Contractor shall perform with his/her own organization and with the assistance of employees under his/her immediate supervision, all work, except that which requires highly specialized knowledge, craftsmanship, or equipment not ordinarily available in the organization of Contractors performing work of the character in the Contract.

B. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

C. Unless otherwise provided in the Supplementary Conditions, within ten (10) days after award of the Contract, the Contractor shall submit to the Owner a list giving the names and addresses of Subcontractors s/he proposes to use, together with the scope of their respective parts of the work. Should any Subcontractor be disapproved by the Owner, the Contractor shall submit additional names for approval. The Owner shall act promptly in the approval of Subcontractors, and when approval of the list is given, no changes of Subcontractors will be permitted except for cause or reason considered justifiable by the Owner. Subcontractors must be properly licensed in accordance with Jacksonville City Code 11-9.

D. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

E. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

F. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

G. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

H. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

B. All work within the right-of-way of the North Carolina Department of Transportation (NCDOT) shall be accomplished in a manner and be subject to the approval of NCDOT officials and the Engineer. Permission for and the acceptance of any work done within the right-of-way controlled by NCDOT will be the Contractor's responsibility. The Contractor shall post bond as required by the Department of Transportation (DOT).

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor’s compliance with any Laws or Regulations. Contractor shall at all times comply with all such laws, ordinances, regulations, orders and decrees; and to the fullest extent permitted by Laws and Regulations shall protect and indemnify the Owner and his/her representatives against any claim or liability arising from or based on the violation of any law, ordinances, regulation, order, or decree, whether by himself/herself, or his/her employees.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor’s primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor’s obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are

unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

D. Refer to Article SC-18 for Laws and Regulations which, by terms of said Laws and Regulations, are to be included in the Contract Documents. The failure to include in Article SC-18 any Law or Regulation applicable to the performance of the Work does not diminish Contractor's responsibility to comply with all Laws and Regulations applicable to the performance of the work.

E. The Contractor shall keep himself/herself fully informed of all Federal and State laws, all local laws, ordinances, and regulations, and all orders and decrees of bodies and tribunals having any jurisdiction or authority which may in any manner affect those engaged or employed in the work, or which in any way affect the conduct of the work. S/he shall at all times comply with all such laws, ordinances, regulations, orders and decrees; and to the fullest extent permitted by Laws and Regulations shall protect and indemnify the City and its representatives against any claim or liability arising from or based on the violation of any law, ordinances, regulation, order, or decree, whether by himself/herself, or his/her employees.

F. The Contractor and any of its subcontractors for work founded under this Agreement shall comply with the Clean Air Act, as amended, 42 USC 1857 et seq., and the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq., The Americans with Disabilities Act of 1990, as amended, 42 USC 12101 et seq., and the regulations of the Environmental Protection Agency with respect thereto, at 40 CFR Part 15, as amended from time to time.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work, Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris.

Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. The Contractor will keep the site within and around the operations clean and neat and free of trash and debris accumulations at all times. S/he will keep it free from inflammable or dangerous stored materials at all times. If such is not done as directed, it will be done by the Owner and such costs charged to the Contractor. Upon completion, all parts of the work shall be left clean and neat to present a finished appearance.

E. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

F. The Contractor shall not cut, trim or damage in any way any tree or large shrub along the line of the Work without the permission of the Engineer in each case. The Engineer reserves the right to forbid the use of any machine or any method of work that, in his/her opinion, is likely to cause damage to trees and other vegetation.

G. The Contractor shall be responsible for all poles, posts, fences, or any other structures or objects existing along the line of his/her work within or without the limits of the excavation. S/he shall relocate, shore, or otherwise support them when necessary, and shall repair and make good any damage caused thereto by this work. All culverts, bridges, curbs and gutters, driveway entrances, driveways, or other structures or objects destroyed or disturbed in the execution of the Contract shall be properly repaired or replaced by the Contractor as part of his/her obligations under this Contract with no direct payment therefore except as set forth in the Basis of Payment section of these Specifications.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

B. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with all Laws and regulations. Contractor shall provide a centralized location for the maintenance of the material safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the material safety data sheets or other hazard communication information shall be readily accessible to the employees of any employer on the Site.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings*

    a. Submit number of copies specified in the General Requirements.

    b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*

    a. Submit number of Samples specified in the Specifications.

    b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

    a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

    b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

    c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

    d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work,

conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused by any act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws or Regulations.

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not be limited in any way by the amount or types of insurance provided by Contractor under Article 5 of the General Conditions.

D. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the sole negligence or willful misconduct of Owner or Engineer or to the officers, directors, partners, employees, agents, and consultants and subcontractors of each and any of them.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other

submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Legal Relationships*

A. Paragraph 7.01.A is not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

7.03 *Separate Contractor Claims*

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work be made by any other contractor against Contractor, Owner or Engineer, Contractor shall promptly settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner, Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including but not limited to, all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising directly, indirectly, or consequentially out of or relating to any claim or action, legal or equitable, brought by any other contractor against Owner or Engineer to the extent said claim is based upon Contractor's performance of the Work.

C. Should another contractor cause damage to the Work or property of Contractor at the Site or should the performance of work by any other contractor at the Site give rise to any other claim, Contractor shall not institute any action, legal or equitable, against Owner or Engineer or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner or Engineer on account of any such damage or claim.

D. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim therefore in accordance with Article 12.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.03 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.04 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface

conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.05 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.06 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.07 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.08 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.09 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.10 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis

of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, or have control over Contractor's Work, nor shall Engineer have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by Contractor, for safety precautions and programs incident to Contractor's Work in progress, nor for any failure of Contractor to comply with Laws and Regulations applicable to Contractor's furnishing and performing the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. The Owner may have changes made in the work covered by the Contract without invalidating the Contract and without relieving or releasing the Contractor from any guarantee given by him/her pertinent to the Contract provisions, without affecting validity of the guarantee bond and without relieving or releasing the surety or sureties of said bond by Change Order or Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

Except in an emergency endangering life or property, NO CHANGE SHALL BE MADE EXCEPT UPON WRITTEN ORDERS from the Engineer, countersigned by the Owner authorizing such change, and no Claim for adjustment of the Contract price shall be valid unless so ordered.

In determining the values of changes either additions or deletions, Contractors are restricted to the use of either of the three (3) following methods, singly or in combination:

1. Where the extra work involved is covered by unit prices quoted in the Proposal, the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed of the items involved.

2. The Contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the Change Order and the Change Order shall stipulate the corresponding lump sum adjustment to the Contract Price.

3. In event of emergency endangering life or property, the Contractor may be directed to proceed on a time and material basis whereupon the Contractor shall so proceed and keep accurately in such form as may be required, a correct account of costs together with all proper invoices, payrolls, and supporting data therefor. Upon completion of the Work, the Change Order will be prepared as outlined under either method (a) or (b), or both. Method (c) shall be used only in event of emergency endangering life or property.

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited

to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs

incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

C. If Owner, Engineer, or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

D. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of other contractors or utility owners, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.D.

E. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. No work or materials will be covered up until inspected and approved. Work covered before such inspection shall be uncovered at the Contractor's expense and cover material shall be replaced at his expense after approval is given.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within eighteen months after the date of Substantial Completion (or such period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within three days after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Value*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

1. On or before the date specified in the Agreement (but not more than once a month), the Contractor shall submit to the Engineer for review an Application for Payment (Payment Request Summary) form filled out and signed by the Contractor covering the work completed as of the date of the Payment Request Summary and accompanied by such supporting documentation as is required by the Contract Documents and also as the Owner may reasonably require.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application shall include an Affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

5. The North Carolina State Sales Tax shall be included in the Contract Price. The Contractor shall maintain and shall be responsible for seeing that his/her Subcontractors maintain accurate records of all payments of North Carolina State Sales Taxes on materials, supplies, fixtures, and equipment which become a part of or are annexed to buildings or structures, including pipe lines provided under this Contract.

6. The Contractor shall submit with his/her monthly Application for Payment, a certified statement showing such payments by himself/herself, and all Subcontractors listing invoices from various suppliers showing invoice number, amount paid and date. Sales tax records and certified statements shall be in such form and substance as to meet the requirements of the North Carolina State Department of Revenue in the matter of the Owner obtaining a refund from the State of North Carolina of sales taxes paid by the Contractor and his/her Subcontractors.

B. *Review of Applications*

1. The Engineer will, by the tenth (10th) day of the following month, either forward the Progress Payment Request Summary to the City Finance Department for payment or return the Progress Payment Request Summary to the Contractor indicating in writing the Engineer's reason for refusing to process the payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Payment Request Summary form.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

1. 30 days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c.there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to

by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

4. In the event that the Engineer is required to provide additional engineering services as a result of Contractor's errors, omissions, or failure to conform to the requirements of the Contract Documents, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be deducted from the monies due the Contractor.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use, Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.04 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c.a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. In the event the Work of this Contract is not completed within the time set forth in the Contract or within the time to which such completion may have been extended in accordance with the Contract Documents, the additional engineering or inspection charges incurred by the Owner may be charged to the Contractor and deducted from the monies due him. Extra work or supplemental Contract work added to the original Contract, as well as extenuating circumstances beyond the control of the Contractor, will be given due consideration by the Owner before assessing engineering and inspection charges against the Contractor.

B. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When

exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or

otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Any dispute arising from a forthcoming agreement to construct this Project shall be subject to non-binding mediation in accordance with the rules as set forth in City of Jacksonville Resolution #2002-28 titled "Senate Bill 914 Dispute Resolution". The following disputes are not subject to mediation: i) A dispute seeking a non-monetary recovery; and ii.) A dispute seeking monetary recovery of $15,000 or less. The full text of this resolution is attached.in the Supplementary Conditions

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor. All warranties and guarantees in effect beyond the date of final payment shall be issued in the name of the Owner.

17.05 *Controlling Law*

A. Any Agreement, Contract, or purchase order resulting from this invitation, request for bid, or request for proposal shall be governed by the laws of the State of North Carolina.

B. The Bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

17.07 *Publicity*

A. Contractor shall not disclose to any third party the nature of its Work on the Project nor engage in publicity or public media disclosures with respect to the Project without the prior written consent of Owner.

+ + END OF GENERAL CONDITIONS + +

00810 SUPPLEMENTARY CONDITIONS

SCOPE

These Supplementary Conditions amend or supplement the General Conditions. All provisions of the General Conditions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to the singular and plural thereof.

SC-1.01.A.24 Amend Paragraph 1.01.A.24 to read as follows:

Any and all applicable laws, rules, and regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts will be construed pursuant to the laws of the State of North Carolina. All claims and disputes arising from any contract shall be construed pursuant to the laws of the State of North Carolina. The State of North Carolina is the proper jurisdiction for all claims and disputes arising under any contract and the proper venue is the Onslow County Superior Court.

SC-4.02 Add a new Paragraph immediately after Paragraph 4.02.B which is to read as follows:

SC-4.02.C In the preparation of the Drawings and Specifications, Engineer has relied upon:

1. The following report of explorations and tests of subsurface conditions at the Site.
   a. Geotechnical Engineering Report by ECS Southeast, LLP for Jacksonville Transit dated June 10, 2019.
   b. The technical data contained in such report upon which Contractor may rely are: the boring method, the locations and logs of the borings, the levels of subsurface water (if any), laboratory test methods and results, and similar factual data. Bore hole information represents subsurface characteristics to the extent indicated, only for the point location of the bore hole and, with regard to the level of subsurface water (if any), only at the time the boring was made. Contractor shall make its own interpretations of the subsurface characteristics to be encountered between bore holes and its own interpretations of the fluctuation of the level of subsurface water (if any) at and between bore holes.

c. A copy of the above report has been included with the specifications.

SC-4.06 Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

SC-4.06.A In the preparation of the Drawings and Specifications, Engineer has not utilized any report or drawing related to a Hazardous Environmental Condition identified at the Site.

SC-4.06.B (Not Used)

NOTE TO ENGINEER: See NOTE TO ENGINEER at SC-13.07.A. For a capital project over 1 million dollars in value, consider reducing the bonding requirements to one year instead of 18 months as specified. If the 18 month correction period is reduced, reduce the period of the performance and payment bonds are to remain in effect accordingly. Insert the appropriate number of years or months at No. 1.

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SC-5.01.A Modify the first part of the second sentence of Paragraph 5.01.A of the General Conditions to read:

These bonds shall remain in effect for (--1--) years after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents.

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NOTE TO CITY ATTORNEY: Paragraph 5.04 of the General Conditions describes the insurance requirements required for the project. If higher limits of insurance or additional types of insurance such as pollution, (get possible list from Contract Specialist) are appropriate, change the types of insurance required or the minimum limits as identified below. For Comprehensive Automobile Liability, the minimum should be at least $1,000,000. Insert the minimum limit for Comprehensive Automobile Liability, usually $1,000,000 at (--1--). For Comprehensive General Liability, the minimum should be at least $1,000,000. Insert the minimum limit for Comprehensive General Liability, usually $1,000,000 at (--2--). For Umbrella Liability, the minimum should be at least $5,000,000. Insert the minimum limit for Umbrella Liability, usually $5,000,000 at (--3--).

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SC-5.04.B.1 Delete the first sentence of Paragraph 5.04.B.1 and insert the following sentence:

The liability limits shall be not less than (--1--) Single Limit.

SC-5.04.B.2 Delete the first sentence of Paragraph 5.04.B.2 and insert the following sentence:

The liability limits shall be not less than (--2--) Single Limit.

SC-5.04.B.4 Delete the first sentence of Paragraph 5.04.B.4 and insert the following sentence:

The liability limits shall be not less than (--3--).

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NOTE TO ENGINEER: Below are three versions of SC9.03 describing three different alternatives for assigning the roles and responsibilities of the Resident Project Representative. Use the first version of SC9.03 if Engineer (defined in Agreement as an entity that is not the City) will have a Resident Project Representative(s) on the Project. Compare closely with Engineering Services Agreement and edit accordingly. If City is to provide Owner's Resident Project Representative for a project where City is defined in the Agreement as the Engineer, use the second version below. If City is to provide Resident Project Representative on a project where the City is ***not*** *defined as the Engineer in the Agreement, use the third version below. Delete versions not used.*

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SC-9.03 Add a new paragraph immediately after Paragraph 9.03.A, which is to read as follows:

SC-9.03.B Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

1. Duties and Responsibilities to RPR:
    a. Schedules: Review the Progress Schedule, Schedule of Submittals and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
    b. Conferences and Meetings: Attend meetings with Contractor , such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
    c. Liaison:
        1) Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in providing understanding of the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's operations on the Site.

2) Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

d. Shop Drawings and Samples:
   1) Record date of receipt of Shop Drawings and Samples, which are received at the Site.
   2) Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
   3) Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or Sample if the submittal has not been approved by Engineer.

e. Review of Work, Rejection of Defective Work, Inspections and Tests:
   1) Conduct observations of the Work in progress on the Site to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
   2) Report to Engineer whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform generally to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
   3) Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startups.
   4) Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.

f. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

g. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.

h. Records:

1) Maintain at the Site orderly files for correspondence, reports of job conferences, Shop Drawings and Samples, and reproductions of original Contract Documents including all Addenda, Change Orders, Work Change Directives, Field Orders, additional Drawings issued subsequent to the execution of the Agreement, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
2) Keep a record, recording Contractor's hours on the Site, weather conditions, data relative to questions on Change Orders or changed conditions, list of visitors to the Site, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.
3) Record names, addresses and telephone numbers of all Contractors, Subcontractors and major suppliers of materials and equipment.

i. Reports:
1) Furnish Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Submittals.
2) Consult with Engineer in advance of scheduled major tests, inspections or start of important phases of the Work.
3) Draft proposed Change Orders, obtaining backup material from Contractor and recommend to Engineer Change Orders and Field Orders.
4) Report immediately to Engineer and Owner upon the occurrence of any Site accident, any Hazardous Environmental Condition, emergencies or acts of God endangering the Work, or property damage by fire or other cause.

j. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and submit recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed and materials and equipment delivered at the Site but not incorporated in the Work.

k. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered

to Engineer for review and forwarding to Owner prior to final payment for the Work.

l. Completion:
   1) Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.
   2) Observe whether Contractor has arranged for inspections required by Laws and Regulations, including but not limited to those to be performed by public agencies having jurisdiction over the Work.
   3) Conduct final inspection in the company of Engineer, Owner and Contractor and prepare a final list of items to be completed or corrected.
   4) Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning acceptance of the Work.

2. Limitations of Authority of RPR: RPR shall not:
   a. Authorize any deviation from the Contract Documents or substitution of materials or equipment, including "or equal" items.
   b. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
   c. Undertake any of the responsibilities of Contractor, Subcontractors or Contractor's superintendent.
   d. Advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.
   e. Advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.
   f. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
   g. Authorize Owner to occupy the Project in whole or in part.
   h. Participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

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NOTE TO ENGINEER: See Note to Engineer SC 5.01.A. A correction period of eighteen months is customary and should be used unless Owner mandates a shorter period in the event the capital project has a value greater than 1 million dollars. This may be applicable for certain large projects – discuss with City Engineer. If the 18 month correction period is reduced, reduce the period of the performance and payment bonds are to remain in effect accordingly in SC 5.01.A. If it is determined that the correction period is to be less than 18 months, insert the appropriate number of years or months at No. 1.

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SC-13.07 Modify Paragraph 13.07.A by changing the word "eighteen months" in the first line to (--1--).

ARTICLE SC-14 – PAYMENTS TO CONTRACTORS AND COMPLETIONS

SC-14.02 A.7 Effective January 1, 2017, generally all Repair, Maintenance and Installation (RMI) services and service contracts will be taxable unless specifically exempted and in accordance with North Carolina General Statutes 105-164.3(33e), 105-164.4(a)(13), and 105-164.4H. In compliance with this law, the Owner has supplied the "Affidavit of Capital Improvement" (E-589CI) to inform the Contractor that this project or a portion thereof meets the definition of a Capital Improvement and therefore is taxed for sales and use tax purposes as a real property contract with respect to a capital improvement to real property.

ARTICLE SC-18 - STATUTORY REQUIREMENTS

SC-18.01 This Article contains portions of certain Laws or Regulations which, by provision of Law or Regulations, are required to be included in the Contract Documents. The material included in this Article may not be complete or current. Contractor's obligation to comply with all Laws and Regulations applicable to the Work is set forth in Paragraph 6.09 of the General Conditions.

SC-18.02 Senate Bill 914 Dispute Resolution is provided in Attachment 1.

++END OF DOCUMENT++

Attachment 1 – Senate Bill 914 Dispute Resolution

RESOLUTION (#2002 28)

SENATE BILL 914 DISPUTE RESOLUTION

WHEREAS, the General Assembly of North Carolina adopted Senate Bill 914, which enacted major changes to the laws governing construction by public entities; and

WHEREAS, included in these changes was the requirement that public entities adopt a Dispute Resolution; and

WHEREAS, any dispute arising from an agreement to construct a Project shall be subject to non-binding mediation in accordance with the rules as set forth for Mediation Settlement Conferences in Onslow County Superior Court and that these rules be incorporated as Attachment A;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Jacksonville that:

1. It is understood and agreed that NCGS 143-128(g-h) requires that disputes arising under an agreement for the erection, construction, alteration or repair of a building be subject to a dispute resolution process specified by the Owner. In compliance with this statutory provision, the Owner specifies this Article as the dispute resolution process to be used on this Project. It is further understood and agreed that this dispute resolution process is based on non-binding mediation and will only be effective to the extent that the Parties to any mediated dispute participate in the mediation in good faith. It is also understood and agreed that the Owner is under no obligation under any circumstance to secure or enforce the participation of any other Party in the mediation of any dispute subject to this Article and GS 143-128(g-h).
2. Any dispute arising between or among the Parties listed in Section 4 of this Article that arises from an agreement to construct the Project, including without limitation a breach of such agreement, shall be subject to non-binding mediation in accordance with rules as set forth for Mediation Settlement Conferences in Onslow County Superior Court. To the extent any provision of the Rules is inconsistent with the provisions of this Article, the provisions of this Article shall control. The mediation provided in this Article shall be used pursuant to this Agreement and GS 143-128(g-h) and is in lieu of any dispute resolution process adopted by the North Carolina State Building Commission, which process shall not apply to this Project.
3. For purposes of this Article the following definitions shall apply:
   Agreement to construct the Project means an agreement to construct the Project that is subject to the requirements of GS 143-128 and does not include any agreement related to the Project that is not subject to said statute.
   Construct or *construction* refers to and includes the erection, construction, alteration or repair of the Project; and
   Party or *Parties* refers to the parties listed in Section 4 of this Article; and
   Project means the building to be erected, constructed, altered or repaired pursuant to this Agreement.
4. The Owner and any Party contracting with the Owner or with any first-tier or lower-tier subcontractor for the construction of the Project agree to participate in good faith in any mediation of a dispute subject to this Article and GS 143-128(g-h), including without limitation the following Parties (if any): architect(s), engineer(s), surveyor(s), construction manager, construction manager at risk, prime contractor(s), surety(ies), subcontractor(s), and supplier(s).
5. In order to facilitate compliance with GS 143-128(g-h), the Contractor, and all other Parties, shall include this Article in every agreement to which it (any of them) is a Party for the construction of the Project without variation or exception. Failure to do so will constitute a breach of this Agreement, and the Contractor or other Party failing to include this Article in any agreement required by this Article shall indemnify and hold harmless the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation, arising in any manner from such breach. Notwithstanding the foregoing provisions of this Section, it is expressly understood and agreed that the Parties are intended to be and shall be third-party beneficiaries of the provisions of this Article and can enforce the provisions hereof.
6. a. The following disputes are not subject to mediation:
      i. A dispute seeking a non-monetary recovery; and
      ii. A dispute seeking a monetary recovery of $15,000 or less.
   b. A dispute seeking the extension of any time limit set forth in an agreement to construct the Project shall be subject to mediation pursuant to this Article and GS 143-128(g-h), but only if the damages which would be suffered by the Party seeking the extension would exceed $15,000 if the disputed extension is denied. To the extent that liquidated damages are set forth in such agreement as the measurement of damages for failure by such Party to meet such time limit, such liquidated damages shall be the exclusive standard for determining the amount of damages associated with such dispute.
7. For purposes of this Article, a dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two or more Parties alleged to be liable jointly, severally or in the alternative. Two or more disputes may not be consolidated or otherwise combined without the consent of all Parties to such disputes.
8. In addition to such matters as are required by the Rules, a request for mediation shall include the amount of the monetary relief requested.
9. Prior to requesting mediation, a Party must form a good faith belief that it is entitled under applicable law to recover the monetary amount to be included in the request from one or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation into the dispute that is the subject of the request. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party, unless supported by such investigation and good faith belief by the Party requesting the mediation.
10. If a Party breaches any provision of Section 9, it shall indemnify and hold harmless all other Parties from any costs, including reasonable attorney fees and other costs of litigation, and damages incurred by such other Parties that arise from such breach.

11. All expenses incurred by a Party to a dispute in preparing and presenting any claim or defense at the mediation shall be paid by the Party. Such expenses include without limitation preparation and production of witnesses and exhibits and attorney fees. All other expenses of the mediation, including filing fees and required traveling and other expenses of the mediator, shall be borne as follows: one half by the Party requesting the mediation, with the remaining parties paying equal shares of the remaining expenses and costs; provided that, if the Owner is named as a party to the mediation, the Owner shall pay at least one-third of the mediation expenses and costs divided among the Parties. If more than one Party to a dispute requests a mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; provided that, if the Owner is named as a party to the mediation, the Owner shall pay at least one-third of the mediation expenses and costs divided among the Parties.
12. The mediation shall be held at a location agreeable to the mediator and all of the Parties; provided that, if no agreement can be reached, the mediation will be held at such location in Onslow County, as the mediator shall determine.
13. The provisions of this Article are subject to any other provision of this Agreement concerning the submission, documentation and/or proof of any claim or dispute. Such other provisions shall apply in full force and shall be satisfied as a condition precedent to mediation pursuant to this Article.
14. The Parties understand and agree that mediation in accordance with this Article shall be a condition precedent to institution of any legal or equitable proceeding seeking monetary recovery based on any dispute that is subject to mediation pursuant to this Article.

ATTACHMENT A

JUDICIAL DISTRICT 4-B
AMENDED RULES FOR SUPERIOR COURT
MEDIATED SETTLEMENT CONFERENCES
ONSLOW COUNTY
APRIL 1997

RULE 1. ORDER FOR MEDIATED SETTLEMENT CONFERENCE

A. BY ORDER IN EACH ACTION

(1) Order by Senior Resident Superior Court Judge. The Senior Resident Superior Court Judge may, by written order, require all persons and entities identified in Rule 4 to attend a pre-trial mediated settlement conference in any civil action except an action in which a party is seeking the issuance of an extraordinary writ or is appealing the revocation of a motor vehicle operator's license.

(2) Timing of the Order. The Senior Resident Superior Court Judge shall issue the order as soon as practicable after the time for the filing of answers has expired. Rules 1.A.(3) and 3.B. herein shall govern the content of the order and the date of completion of the conference.

(3) Content of Order. The court's order shall (1) require the mediated settlement conference be held in the case; (2) establish a deadline for the completion of the conference; (3) state clearly that the parties have the right to select their own mediator as provided by Rule 2; (4) state the rate of compensation of the court appointed mediator in the event that the parties do not exercise their right to select a mediator pursuant to Rule 2; and (5) state that the parties shall be required to pay the mediator's fee at the conclusion of the settlement conference unless otherwise ordered by the court. The order shall be on a form prepared and distributed by the Administrative Office of the Courts.

(4) Motion for Court Ordered Mediated Settlement Conference. In cases not ordered to mediate settlement conference, any party may file a written motion with the Senior Resident Superior Court Judge requesting that such conference be ordered. Such motion shall state the reasons why the order should be allowed and shall be served on non-moving parties. Objections to the motion may be filed in writing with Senior Resident Superior Court Judge within 10 days after the date of the service of the motion. Thereafter, the Judge shall rule upon the motion without a hearing and notify the parties or their attorneys of the ruling.

(5) Motion to Dispense With Mediated Settlement Conference. A party may move the Senior Resident Superior Court Judge, within 10 days after the Court's order, to dispense with the conference for good cause shown. Such motion shall state the reasons the relief is sought. The motion shall be mailed to the Senior Resident Superior Court Judge in care of the Judicial Assistant and to all opposing parties who may file objections with the Senior Resident Superior Court Judge within 7 days of the date of the motion. The Senior Resident Superior Court Judge will rule upon all motions and objections without hearing and notify all parties of the ruling.

(6) Consent Motion to Authorize the Use of Other Settlement Procedures. No later than 10 days after issuance of the Court's mediation order, a party may move the Senior Resident Superior Court Judge to authorize the use of some other settlement procedure in lieu of a mediated settlement conference. Such motion shall state the reasons the authorization is requested and that all parties consent to the motion. The Court may order the use of any agreed upon settlement procedure authorized by Supreme Court or local rules. The deadline for completion of the authorized settlement procedure shall be the same as ordered for the mediated settlement conference.

(7) Exemption from Mediated Settlement Conferences. The Senior Resident Superior Court Judge may be required by the Administrative Office of the Courts to exempt from such conferences a random sample of cases so as to create a control group to be used for comparative analysis.

RULE 2. SELECTION OF MEDIATOR

A. Selection of Certified Mediator by Agreement of Parties. The parties may select a mediator certified pursuant to these Rules by agreement within 21 days of the court's order. The plaintiff's attorney shall file with the court a Notice of Selection of Mediator by Agreement within 21 days of the court's order. Such notice shall state the name, address and telephone number of the mediator selected; state the rate of compensation of the mediator; state that the mediator and opposing counsel have agreed upon the selection and rate of compensation; and state that the mediator is certified pursuant to these Rules. The notice shall be on a form prepared and distributed by the Administrative Office of the Courts.

B. Nomination and Court Approval of a Non-Certified Mediator. The parties may select a mediator who does not meet the certification requirements of these Rules but who, in the opinion of the parties and the Senior Resident Superior Court Judge, is otherwise qualified by training or experience to mediate all or some of the issues in the action and who agrees to mediate indigent cases without pay.

If the parties select a non-certified mediator, the plaintiff's attorney shall file with the court a Nomination of Non-Certified Mediator within 21 days of the court's order. Such nomination shall state the name, address and telephone number of the mediator; state the training, experience or other qualifications of the mediator; state the rate of compensation of the mediator; and state that the mediator and opposing counsel have agreed upon the selection and rate of compensation.

The Senior Resident Superior Court Judge shall rule on said nomination without a hearing, shall approve or disapprove of the parties' nomination and shall notify the parties of the court's decision. The nomination and approval or disapproval of the court shall be on a form prepared and distributed by the administrative Offices of the Courts.

C. Appointment of Mediator by the Court. If the parties cannot agree upon the selection of a mediator, the plaintiff or plaintiff's attorney shall so notify the court and request, on behalf of the parties, that the Senior Resident Superior Court Judge appoint a mediator. The motion must be filed within 21 days after the court's order and shall state that the attorneys for the parties have had a full and frank discussion concerning the selection of a mediator and have been unable to agree. The motion shall be on a form prepared and distributed by the Administrative Office of the Courts. The motion shall state whether any party prefers a certified attorney mediator, and if so, the Senior Resident Judge shall appoint a certified attorney mediator. The motion may state that all parties prefer a certified, non-attorney mediator, and if so, the Senior Resident Judge shall appoint a certified non-attorney mediator if one is on the list of certified mediators desiring to mediate cases in the district. If no preference is expressed, the Senior Resident Judge may appoint a certified attorney mediator or a certified non-attorney mediator.

Upon receipt of a motion to appoint a mediator, or in the event the plaintiff's attorney has not filed a Notice of Selection or Nomination of the Non-Certified Mediator with the court within 21 days of the court's order, the Senior Resident Superior Court Judge shall appoint a mediator certified pursuant to these Rules, under a procedure established by said Judge. Only mediators who agree to mediate indigent cases without pay and have indicated their desire to mediate cases in Judicial District 4B shall be appointed.

D. Mediator Information Directory. To assist the parties in the selection of a mediator by agreement, the Senior Resident Superior Court Judge shall prepare and keep current a central directory of information on all certified mediators who wish to mediate cases in Judicial District 4B. This information shall be collected on loose leaf forms provided by the Dispute Resolution Commission and be kept in one or more notebooks made available for inspection by attorneys and parties in the office of the Clerk of Court in Onslow County.

E. Disqualification of Mediator. Any party may move the Senior Resident or Presiding Superior Court Judge of Judicial District 4B for an order disqualifying the mediator. For good cause, such order shall be entered. If the mediator is disqualified, a replacement mediator shall be selected or appointed pursuant to Rule 2. If such order is entered, the moving party shall provide a copy of the order to the Trial Court Administrator within 5 days of the date of the order. Nothing in this provision shall preclude mediators from disqualifying themselves upon written notice to the Trial Court Administrator and all parties.

RULE 3. THE MEDIATED SETTLEMENT CONFERENCE

A. Where Conference is to be Held. Unless all parties and the mediator otherwise agree, the mediated settlement conference shall be held in the courthouse or other public or community building in the county where the case is pending. The mediator shall be responsible for reserving a place and making arrangements for the conference and for giving timely notice of the time and location of the conference to all attorneys, unrepresented parties and other persons and entities required to attend.

B. When Conference is to be Held. As a guiding principle, the conference should be held after the parties have had a reasonable time to conduct discovery but well in advance of the trial date

The court's order issued pursuant to Rule 1.A.(1). Shall state a date of completion for the conference which shall be not less than 120 days nor more than 180 days after issuance of the court's order.

C. Request to Extend Date of Completion. A party, or the mediator, may request the Senior Resident Superior Court Judge to extend the deadline for completion of the conference. Such request shall state the reasons the extension is sought and shall be served by the moving party upon the other parties and the mediator. If any party does not consent to the request, said party shall promptly communicate its objection to the office of the Senior Resident Superior Court Judge.

The Senior Resident Superior Court Judge may grant the request by entering a written order setting a new date for the completion of the conference, which date may be set at any time prior to trial. Said order shall be delivered to all parties and the mediator by the person who sought the extension.

D. Recesses. The mediator may recess the conference at any time and may set times for reconvening. No further notification is required for persons present at the recessed conference.

E. The Mediated Settlement Conference is Not To Delay Other Proceedings. The mediated settlement conference shall not be cause for the delay of other proceedings in the case, including the completion of discovery, the filing or hearing of motions, or the trial of the case, except by order of the Senior Resident Superior Court Judge.

RULE 4. DUTIES OF PARTIES, ATTORNEYS AND OTHER PARTICIPANTS

A. Attendance.

(1) The following persons shall attend a mediated settlement conference:

(a) Parties

(i) All individual parties;

(ii) Any party that is not a natural person or governmental entity shall be represented at the conference by an officer, employee or agent who is not such party's outside counsel and who has been authorized to decide on behalf of such party whether and on what terms to settle the action;

(iii) Any party that is a governmental entity shall be represented at the conference by an employee or agent who is not such party's outside counsel and who has authority to decide on behalf of such party whether and on what terms to settle the action; provided, if under law proposed settlement terms can be approved only by a board, the representative shall have authority to negotiate on behalf of the party and to make a recommendation to that board;

(b) Insurance Company Representatives. A representative of each liability insurance carrier, uninsured motorist insurance carrier, and underinsured motorist insurance carrier which may be obligated to pay all or part of any claim presented in the action. Each such carrier shall be represented at the conference by an officer, employee or agent, other than the carrier's outside counsel, who has the authority to make a decision on behalf of such carrier or who has been authorized to negotiate on behalf of the carrier and can promptly communicate during the conference with persons who have such decision-making authority;

(c) Attorneys. At least one counsel of record for each party or other participant, whose counsel has appeared in the action.

(2) Any party or person required to attend a mediated settlement conference shall physically attend until an agreement is reduced to writing and signed as provided in Rule 4.C. or an impasse has been declared. Any such party or person may have the attendance requirement excused or modified, including the allowance of the party's or person's participation without physical attendance:

(a) By agreement of all parties and persons required to attend and the mediator; or

(b) By order of the Senior Resident Superior Court Judge, upon motion of a party and notice to all parties and persons required to attend and the mediator.

B. Notifying Lien Holders. Any party or attorney who has received notice of a lien or other claim upon proceeds recovered in the action shall notify said lien holder or claimant of the date, time, and location of the mediated settlement conference and shall request said lien holder or claimant to attend the conference or make a representative available with whom to communicate during the conference.

C. Finalizing Agreement. If an agreement is reached in the conference, parties to the agreement shall reduce its terms to writing and sign it along with their counsel. By stipulation of the parties and at their expense, the agreement may be electronically or stenographically recorded. A consent judgment or one or more voluntary dismissals shall be filed with the court by such persons as the parties shall designate.

D. Provide Copy of Agreement. Upon reaching a settlement agreement before or during the conference, the parties and others with settlement authority, shall provide a copy of the executed written agreement to the mediator within 7 days of the settlement. The mediator shall attach a copy of the agreement to the Report of Mediator and mail both to the Trial Court

Administrator. Failure of the parties to provide a copy of the written agreement to the mediator on a timely basis will result in sanctions as for failure to attend (see Rule 5.)

E. Payment of Mediator's Fee. The parties shall pay the mediator's fee as provided by Rule 7.

RULE 5. SANCTIONS FOR FAILURE TO ATTEND

If a party or other person required to attend a mediated settlement conference fails to attend without good cause, the Senior Resident or Presiding Judge may impose upon the party or person any appropriate monetary sanction including, but not limited to, the payment of fines, attorneys fees, mediator fees, expenses and loss of earning incurred by persons attending the conference.

A party seeking sanctions against another party or person shall do so in a written motion stating the grounds for the motion and the relief sought. Said motion shall be served upon all parties and on any person against whom sanctions are being sought. If the court imposes sanctions, it shall do so, after notice and a hearing, in a written order, making findings of fact supported by substantial evidence and conclusions of law.

RULE 6. AUTHORITY AND DUTIES OF MEDIATORS

A. Authority of Mediator.

(1) Control of Conference. The mediator shall at all times be in control of the conference and the procedures to be followed.

(2) Private Consultation. The mediator may communicate privately with any participant or counsel prior to and during the conference. The fact that private communications have occurred with a participant shall be disclosed to all other participants at the beginning of the conference.

(3) Scheduling the Conference. The mediator shall make a good faith effort to schedule the conference at a time that is convenient with the participants, attorneys, and mediator. In the absence of agreement, the mediator shall select the date for the conference.

B. Duties of Mediator.

(1) The mediator shall define and describe the following at the beginning of the conference.

(a) The process of mediation;

(b) The differences between mediation and other forms of conflict resolution;

(c) The cost of the mediated settlement conference;

(d) The fact that the mediated settlement conference is not a trial, the mediator is not a judge, and the parties retain their right to trial if they do not reach settlement;

(e) The circumstances under which the mediator may meet and communicate privately with any of the parties or with any other person;

(f) Whether and under what conditions communications with the mediator will be held in confidence during the conference;

(g) The inadmissibility or conduct and statements as provided by G.S. 7A-38.1(1);

(h) The duties and responsibilities of the mediator and the participants; and

(i) The fact that any agreement reached will be reached by mutual consent.

(2) Disclosure. The mediator has a duty to be impartial and to advise all participants of any circumstance bearing on possible bias prejudice or partiality.

(3) Declaring Impasse. It is the duty of the mediator timely to determine that an impasse exists and that the conference should end.

(4) Reporting Results of Conference. The mediator shall report to the Court in writing whether or not an agreement was reached by the parties during the conference and any prior settlement of issues sent for mediation. If an agreement was reached, the report shall state whether the action will be concluded by consent judgment or voluntary dismissal and shall identify the persons designated to file such consent judgment or dismissals. The mediator's report shall inform the court of the absence of any party, attorney, or insurance representative known to the mediator to have been absent without permission from the mediated settlement conference. This report shall be filed within 10 days of the conclusion of the conference or in the event the case is settled before mediation, 10 days of the scheduled conference. The Administrative

Office of the Courts may require the mediator to provide statistical data for evaluation of the mediated settlement conference program on forms provided by it.

(5) Scheduling and Holding the Conference. It is the duty of the mediator to schedule the conference and conduct it prior to the conference completion deadline set out in the court's order. Deadlines for completion of the conference shall be strictly observed by the mediator unless said time limit is changed by the written order of the Senior Resident Superior Court Judge.

(6) Sanctions for Failure to Comply. The Senior Resident Superior Court Judge shall reserve the right to withhold future appointments of any mediator who fails to comply with these Rules.

RULE 7. COMPENSATION OF THE MEDIATOR

A. By Agreement. When the mediator is stipulated to by the parties, compensation shall be as agreed upon between the parties and the mediator.

B. By Court Order. When the mediator is appointed by the court, the parties shall compensate the mediator for mediation services at the rate of $100.00 per hour. The parties shall also pay to the mediator a one time, per case administrative fee of $100.00.

C. Indigent Cases. No party found to be indigent by the court for the purposes of these rules shall be required to pay a mediator fee. Any mediator conducting a settlement conference pursuant to these shall waive the payment of fees from parties found by the court to be indigent. Any party may move the Senior Resident Superior Court Judge for a finding of indigence and to be relieved of the party's obligation to pay a share of the mediator's fee.

Said motion shall be heard subsequent to the completion of the conference or, if the parties do not settle their case, subsequent to the trial of the action. The Judge may take into consideration the outcome of the action and whether a judgment was rendered in the movant's favor. The court shall enter an order granting or denying the party's request.

D. Payment of Compensation by Parties. Unless otherwise agreed to by the parties or ordered by the court, the mediator's fee shall be paid in equal shares by the parties. For purposes of this rule, multiple parties shall be considered one party when they are represented by the same counsel. Parties obligated to pay a share of the fees shall pay them equally. Payment shall be due upon completion of the conference. Parties who contend indigent status must immediately upon completion of the conference file a copy of the motion described in Rule 7.C. with the mediator. The mediator shall attach this copy with the final report.

E. Sanctions for Failure to Pay Mediator's Fee. Except when excused by order of the court, failure of a party to make timely payment of their share of a mediator's fee, or failure of parties contending indigent status to file motions described in Rule 7.C. shall constitute contempt of court and will result in the imposition of any and all lawful sanctions.

RULE 8. COMMUNICATIONS WITH THE COURT

All communications with the court concerning mediated settlement conferences in Judicial District 4B should be addressed to the Trial Court Administrator's Office at 625 Court Street, Jacksonville, NC 28540. Telephone number: (910) 455-4541.

20000 FTA PROVISIONS

By submission of a proposal or bid, the Contractor agrees to comply with the following Federal Transit Administration provisions. Failure to comply with any or all of the provisions herein may be cause for the contracting agency to issue a cancellation notice to a Contractor.

INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS

FTA Circular 4220.1F

The following provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the following contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any City of Jacksonville requests which would cause City of Jacksonville to be in violation of the FTA terms and conditions.

ACCESS TO RECORDS AND REPORTS

49 U.S.C. § 5325(g)
2 C.F.R. § 200.333
49 C.F.R. part 633

The record keeping and access requirements extend to all third party contractors and their contracts at every tier and subrecipients and their subcontracts at every tier for all contracts.

A. Record Retention. The Contractor will retain, and will require its subcontractors of all tiers to retain complete and readily accessible records related in whole or in part to the contract, including, but not limited to, data, documents, reports, statistics, sub-agreements, leases, subcontracts, arrangements, other third party agreements of any type, and supporting materials related to those records.

B. Retention Period. The Contractor agrees to comply with the record retention requirements in accordance with 2 C.F.R. § 200.333. The Contractor shall maintain all books, records, accounts and reports required under this Contract for a period of at not less than three (3) years after the date of termination or expiration of this Contract, except in the event of litigation or settlement of claims arising from the performance of this Contract, in which case records shall be maintained until the disposition of all such litigation, appeals, claims or exceptions related thereto.

C. Access to Records. The Contractor agrees to provide sufficient access to FTA and its contractors to inspect and audit records and information related to performance of this contract as reasonably may be required.

D. Access to the Sites of Performance. The Contractor agrees to permit FTA and its contractors access to the sites of performance under this contract as reasonably may be required.

BONDING REQUIREMENTS

2 C.F.R. § 200.325
31 C.F.R. part 223

Bonds are required for all construction or facility improvement contracts and subcontracts exceeding the simplified acquisition threshold. These requirements extend to all third party contractors and their contracts at every tier and subrecipients and their subcontracts at every tier that exceed the simplified acquisition threshold ($150,000).

Contractor shall refer to Section 00431, Section 00610 and Section 00615 as well as General Conditions for more information.

BOND REQUIREMENTS

Bid Guarantee

Bidders shall furnish a bid guaranty in the form of a bid bond, or certified treasurer's or cashier's check issued by a responsible bank or trust company, made payable to the CITY OF JACKSONVILLE. The amount of such guaranty shall be equal to **5%** of the total bid price.

In submitting this bid, it is understood and agreed by bidder that the CITY OF JACKSONVILLE reserves the right to reject any and all bids, or part of any bid, and it is agreed that the Bid may not be withdrawn for a period of 90 days subsequent to the opening of bids, without the written consent of CITY OF JACKSONVILLE.

It is also understood and agreed that if the undersigned bidder should withdraw any part or all of his bid within 90 days after the bid opening without the written consent of the CITY OF JACKSONVILLE, or refuse or be unable to enter into this Contract as provided above, or refuse or be unable to furnish adequate and acceptable Performance and Payment Bonds, or refuse or be unable to furnish adequate and acceptable insurance, as provided above, it shall forfeit its bid guaranty to the extent CITY OF JACKSONVILLE'S damages occasioned by such withdrawal, or refusal, or inability to enter into an agreement, or provide adequate security thereof.

It is further understood and agreed that to the extent the defaulting bidder's bid guaranty shall prove inadequate to fully recompense CITY OF JACKSONVILLE for the damages occasioned by default, then the undersigned bidder agrees to indemnify CITY OF JACKSONVILLE and pay over to CITY OF JACKSONVILLE the difference between the bid guarantee and CITY OF JACKSONVILLE'S total damages so as to make CITY OF JACKSONVILLE whole.

The undersigned understands that any material alteration of any of the above or any of the material contained herein, other than that requested will render the bid unresponsive.

Refer to Article 10 of the Instruction to Bidders for additional information.

Performance Guarantee

A Performance Guarantee in the amount of **100%** of the Contract value is required by the City of Jacksonville to ensure faithful performance of the Contract. A Performance Bond shall be provided by the Contractor and shall remain in full force for the term of the Agreement. The

successful Bidder shall certify that it will provide the requisite Performance Guarantee to the CITY OF JACKSONVILLE within ten (10) business days from Contract execution. The CITY OF JACKSONVILLE requires all Performance Bonds to be provided by a fully qualified surety company acceptable to the CITY OF JACKSONVILLE and listed as a company currently authorized under 31 C.F.R. part 223 as possessing a Certificate of Authority as described hereunder. Please see https://www.fiscal.treasury.gov/fsreports/ref/suretyBnd/c570_a-z.htm for further information regarding qualified surety companies.

CITY OF JACKSONVILLE may require additional performance bond protection when the contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price. The CITY OF JACKSONVILLE may secure additional protection by directing the Contractor to increase the amount of the existing bond or to obtain an additional bond.

Refer to Article 24 of the Instruction to Bidders for additional information.

Payment Bonds

A Labor and Materials Payment Bond equal to the full value of the contract must be furnished by the contractor to City of Jacksonville as security for payment by the Contractor and subcontractors for labor, materials, and rental of equipment. The bond may be issued by a fully qualified surety company acceptable to (City of Jacksonville) and listed as a company currently authorized under 31 C.F.R. part 223 as possessing a Certificate of Authority as described thereunder. Please see https://www.fiscal.treasury.gov/fsreports/ref/suretyBnd/c570_a-z.htm for further information regarding qualified surety companies.

Refer to Article 24 of the Instruction to Bidders for additional information.

BUY AMERICA REQUIREMENTS

49 U.S.C. 5323(j)
49 C.F.R. part 661

FTA's Buy America law and regulations apply to projects that involve the purchase of more than $150,000 of iron, steel, manufactured goods, or rolling stock to be delivered to the City of Jacksonville to be used in an FTA assisted project. FTA cautions that its Buy America regulations are complex. City of Jacksonville can obtain detailed information on FTA's Buy America regulation at: The Federal Transit Administration's Buy America website. These requirements apply to subrecipients to first tier contractors, who are responsible for ensuring that lower tier contractors and subcontractors are in compliance.

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. part 661, which provide that Federal funds may not be obligated unless all steel, iron, and manufactured products used in FTA funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. § 661.7. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. § 661.11.

The bidder or offeror must submit to City of Jacksonville the appropriate Buy America certification below with its bid or offer. Bids or offers that are not accompanied by a completed Buy America certification will be rejected as nonresponsive. Refer to Attachment B or C –

Certificate of Compliance or Non-Compliance with Buy America which is required to be submitted with your bid.

CARGO PREFERENCE REQUIREMENTS

46 U.S.C. §§ 55305
46 C.F.R. Part 381

Cargo Preference - Use of United States-Flag Vessels applies to all contracts involved with the transport of equipment, material, or commodities by ocean vessel.

The Contractor agrees:

A. To use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels;

B. To furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the contractor in the case of a subcontractor's bill-of-lading.); and

A. To include these requirements in all subcontracts issued pursuant to this contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

42 U.S.C. §§ 7401 – 7671q
33 U.S.C. §§ 1251-1388
2 C.F.R. part 200, Appendix II (G)

The Clean Air and Clean Water Act requirements apply to each contract and subcontract exceeding $150,000. The Clean Air Act and Federal Water Pollution Control Act requirements extend to all third party contractors and their contracts at every tier and subrecipients and their subcontracts at every tier.

The Contractor agrees:

1) It will not use any violating facilities;

2) It will report the use of facilities placed on or likely to be placed on the U.S. EPA “List of Violating Facilities;”

3) It will report violations of use of prohibited facilities to FTA; and

4) It will comply with the inspection and other requirements of the Clean Air Act, as amended, (42 U.S.C. §§ 7401 – 7671q); and the Federal Water Pollution Control Act as amended, (33 U.S.C. §§ 1251-1387).

CIVIL RIGHTS LAWS AND REGULATIONS

The following Federal Civil Rights laws and regulations apply to all contracts.

The CITY OF JACKSONVILLE is an Equal Opportunity Employer. As such, the CITY OF JACKSONVILLE agrees to comply with all applicable Federal civil rights laws and implementing regulations. Apart from inconsistent requirements imposed by Federal laws or regulations, the AGENCY agrees to comply with the requirements of 49 U.S.C. § 5323(h) (3) by not using any Federal assistance awarded by FTA to support procurements using exclusionary or discriminatory specifications.

Under this Agreement, the Contractor shall at all times comply with the following requirements and shall include these requirements in each subcontract entered into as part thereof.

1. **Nondiscrimination**. In accordance with Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, sex, disability, or age. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

2. **Race, Color, Religion, National Origin, Sex.** In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e *et seq*., and Federal transit laws at 49 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. chapter 60, and Executive Order No. 11246, "Equal Employment Opportunity in Federal Employment," September 24, 1965, 42 U.S.C. § 2000e note, as amended by any later Executive Order that amends or supersedes it, referenced in 42 U.S.C. § 2000e note. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, national origin, or sex (including sexual orientation and gender identity). Such action shall include, but not be limited to, the following: employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

3. **Age.** In accordance with the Age Discrimination in Employment Act, 29 U.S.C. §§ 621-634, U.S. Equal Employment Opportunity Commission (U.S. EEOC) regulations, “Age Discrimination in Employment Act,” 29 C.F.R. part 1625, the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6101 *et seq*., U.S. Health and Human Services regulations, “Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance,” 45 C.F.R. part 90, and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

4. **Disabilities**. In accordance with section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, the Americans with Disabilities Act of 1990, as amended, 42 U.S.C. § 12101 *et seq.*, the Architectural Barriers Act of 1968, as amended, 42 U.S.C. § 4151 *et seq.*, and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against individuals on the basis of disability. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

VETERANS PREFERENCE/EMPLOYMENT

Contractors working on a capital project funded using Federal financial assistance shall ensure that they give a hiring preference, to the extent practicable, to veterans who have the requisite skills and abilities to perform the construction work required under this contract. This shall not be understood, construed or enforced in any manner that would require an employer to give preference to any veterans over any equally qualified applicant who is a member of any racial or ethnic minority, female, an individual with a disability, or former employee.

DISADVANTAGED BUSINESS ENTERPRISE (DBE)

49 C.F.R. part 26

The Disadvantaged Business Enterprise (DBE) contracting requirements flow down to all third party contractors and their contracts at every tier. It is the recipient's and prime contractor's responsibility to ensure the DBE requirements are applied across the board to all subrecipients/contractors/subcontractors.

The contractor, subrecipients or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 C.F.R. part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the City of Jacksonville deems appropriate, which may include, but is not limited to:

(1) Withholding monthly progress payments;

(2) Assessing sanctions;

(3) Liquidated damages; and/or

(4) Disqualifying the contractor from future bidding as non-responsible. 49 C.F.R. § 26.13(b).

The Contractor shall pay subcontractors for satisfactory performance of their contracts no later than 30 days from receipt of each payment the City of Jacksonville makes to the prime contractor (Prompt Payment Affidavit) in accordance wih 49 C.F.R. § 26.29(a).

Overview

It is the policy of the CITY OF JACKSONVILLE and the United States Department of Transportation ("DOT") that Disadvantaged Business Enterprises ("DBE's"), as defined herein and in the Federal regulations published at 49 C.F.R. part 26, shall have an equal opportunity to participate in DOT-assisted contracts. It is also the policy of the CITY OF JACKSONVILLE to:

1. Ensure nondiscrimination in the award and administration of DOT-assisted contracts;

2. Create a level playing field on which DBE's can compete fairly for DOT-assisted contracts;

3. Ensure that the DBE program is narrowly tailored in accordance with applicable law;

4. Ensure that only firms that fully meet 49 C.F.R. part 26 eligibility standards are permitted to participate as DBE's;

5. Help remove barriers to the participation of DBEs in DOT assisted contracts;

6. To promote the use of DBEs in all types of federally assisted contracts and procurement activities; and

7. Assist in the development of firms that can compete successfully in the marketplace outside the DBE program.

This Contract is subject to 49 C.F.R. part 26. Therefore, the Contractor must satisfy the requirements for DBE participation as set forth herein. These requirements are in addition to all other equal opportunity employment requirements of this Contract. The City of Jacksonville shall make all determinations with regard to whether or not a Bidder/Offeror is in compliance with the requirements stated herein. In assessing compliance, the City of Jacksonville may consider during its review of the Bidder/Offeror's submission package, the Bidder/Offeror's documented history of non-compliance with DBE requirements on previous contracts with the City of Jacksonville.

Contract Assurance
The Contractor, subrecipients or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 C.F.R. part 26 in the award and administration of DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the CITY OF JACKSONVILLE deems appropriate.

DBE Participation

For the purpose of this Contract, the City of Jacksonville will accept only DBE's who are:

1. Certified, at the time of bid opening or proposal evaluation, by the [*certifying agency or the Unified Certification Program (UCP)*]; or

2. An out-of-state firm who has been certified by either a local government, state government or Federal government entity authorized to certify DBE status or an agency whose DBE certification process has received FTA approval; or

3. Certified by another agency approved by the City of Jacksonville.

DBE Participation Goal
The DBE participation goal for this Contract is set at **1.0%.** This goal represents those elements of work under this Contract performed by qualified Disadvantaged Business Enterprises for amounts totaling **not less than 1.0%** of the total Contract price. Failure to meet the stated goal at the time of proposal submission **may** render the Bidder/Offeror non-responsive.

Proposed Submission
Each Bidder/Offeror, as part of its submission, shall supply the following information:

1. A completed **DBE Utilization Form** (see Attachment E) that indicates the percentage and dollar value of the total bid/contract amount to be supplied by Disadvantaged Business Enterprises under this Contract.

2. A list of those qualified DBE's with whom the Bidder/Offeror intends to contract for the performance of portions of the work under the Contract, the agreed price to be paid to each DBE for work, the Contract items or parts to be performed by each DBE, a proposed timetable for the performance or delivery of the Contract item, and other information as required by the **DBE Participation Schedule** (see Attachment E). No work shall be included in the Schedule that the Bidder/Offeror has reason to believe the listed DBE will subcontract, at any tier, to other than another DBE. If awarded the Contract, the Bidder/Offeror may not deviate from the DBE Participation Schedule submitted in response to the bid. Any subsequent changes and/or substitutions of DBE firms will require review and written approval by the City of Jacksonville.

3. An original **DBE Letter of Intent** (see Attachment F) from each DBE listed in the **DBE Participation Schedule** (Attachment E).

4. An original **DBE Affidavit** (see Attachment E) from each DBE stating that there has not been any change in its status since the date of its last certification.

Good Faith Efforts
If the Bidder/Offeror is unable to meet the goal set forth above (DBE Participation Goal), the City of Jacksonville will consider the Bidder/Offeror's documented good faith efforts to meet the goal in determining responsiveness. The types of actions that the City of Jacksonville will consider as part of the Bidder/Offeror's good faith efforts include, but are not limited to, the following:

1. Documented communication with the City of Jacksonville's DBE Coordinator (questions of IFB or RFP requirements, subcontracting opportunities, appropriate certification, will be addressed in a timely fashion);

2. Pre-bid meeting attendance. At the pre-bid meeting, the City of Jacksonville generally informs potential Bidder/Offeror's of DBE subcontracting opportunities;

3. The Bidder/Offeror's own solicitations to obtain DBE involvement in general circulation media, trade association publication, minority-focus media and other reasonable and available means within sufficient time to allow DBEs to respond to the solicitation;

4. Written notification to DBE's encouraging participation in the proposed Contract; and

5. Efforts made to identify specific portions of the work that might be performed by DBE's.

The Bidder/Offeror shall provide the following details, at a minimum, of the specific efforts it made to negotiate in good faith with DBE's for elements of the Contract:

1. The names, addresses, and telephone numbers of DBE's that were contacted;

2. A description of the information provided to targeted DBE's regarding the specifications and bid proposals for portions of the work;

3. Efforts made to assist DBE's contacted in obtaining bonding or insurance required by the Bidder or the Authority.

Further, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted when a non-DBE subcontractor was selected over a DBE for work on the contract. 49 C.F.R. § 26.53(b) (2) (VI). In determining whether a Bidder has made good faith efforts, the City of Jacksonville may take into account the performance of other Bidders in meeting the Contract goals. For example, if the apparent successful Bidder failed to meet the goal, but meets or exceeds the average DBE participation obtained by other Bidders, the Authority may view this as evidence of the Bidder having made good faith efforts.

Administrative Reconsideration
Within five (5) business days of being informed by the City of Jacksonville that it is not responsive or responsible because it has not documented sufficient good faith efforts, the Bidder/Offeror may request administrative reconsideration. The Bidder should make this request in writing to the City of Jacksonville's DBE Coordinator. The DBE Coordinator will forward the Bidder/Offeror's request to a reconsideration official who will not have played any role in the original determination that the Bidder/Offeror did not document sufficient good faith efforts.

As part of this reconsideration, the Bidder/Offeror will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so. The Bidder/Offeror will have the opportunity to meet in person with the assigned reconsideration official to discuss the issue of whether it met the goal or made adequate good faith efforts to do so. The City of Jacksonville will send the Bidder/Offeror a written decision on its reconsideration, explaining the basis for finding that the Bidder/Offeror did or did not meet the goal or make adequate good faith efforts to do so. The result of the reconsideration process is not administratively appealable to the Department of Transportation.

Termination of DBE Subcontractor
The Contractor shall not terminate the DBE subcontractor(s) listed in the **DBE Participation Schedule** (see below) without the City of Jacksonville's prior written consent. The City of

Jacksonville may provide such written consent only if the Contractor has good cause to terminate the DBE firm. Before transmitting a request to terminate, the Contractor shall give notice, in writing, to the DBE subcontractor of its intent to terminate and the reason for the request. The Contractor shall give the DBE five days to respond to the notice and advise of the reasons why it objects to the proposed termination. When a DBE subcontractor is terminated or fails to complete its work on the Contract for any reason, the Contractor shall make good faith efforts to find another DBE subcontractor to substitute for the original DBE and immediately notify the City of Jacksonville in writing of its efforts to replace the original DBE. These good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the Contract as the DBE that was terminated, to the extent needed to meet the Contract goal established for this procurement. Failure to comply with these requirements will be in accordance with Section 8 below (Sanctions for Violations).

Continued Compliance
The City of Jacksonville shall monitor the Contractor's DBE compliance during the life of the Contract. In the event this procurement exceeds ninety (90) days, **it will be the responsibility of the Contractor to submit quarterly written reports to the City of Jacksonville that** summarize the total DBE value for this Contract. These reports shall provide the following details:

- DBE utilization established for the Contract;
- Total value of expenditures with DBE firms for the quarter;
- The value of expenditures with each DBE firm for the quarter by race and gender;
- Total value of expenditures with DBE firms from inception of the Contract; and
- The value of expenditures with each DBE firm from the inception of the Contract by race and gender.

Reports and other correspondence must be submitted to the DBE Coordinator with copies provided to the City of Jacksonville. Reports shall continue to be submitted quarterly until final payment is issued or until DBE participation is completed.
The successful Bidder/Offeror shall permit:

- The City of Jacksonville to have access to necessary records to examine information as the City of Jacksonville deems appropriate for the purpose of investigating and determining compliance with this provision, including, but not limited to, records of expenditures, invoices, and contract between the successful Bidder/Offeror and other DBE parties entered into during the life of the Contract.

- The authorized representative(s) of the City of Jacksonville, the U.S. Department of Transportation, the Comptroller General of the United States, to inspect and audit all data and record of the Contractor relating to its performance under the Disadvantaged Business Enterprise Participation provision of this Contract.

- All data/record(s) pertaining to DBE shall be maintained in all contract records.

Sanctions for Violations
If at any time the City of Jacksonville has reason to believe that the Contractor is in violation of its obligations under this Agreement or has otherwise failed to comply with terms of this

Section, the City of Jacksonville may, in addition to pursuing any other available legal remedy, commence proceedings, which may include but are not limited to, the following:

- Suspension of any payment or part due the Contractor until such time as the issues concerning the Contractor's compliance are resolved; and

- Termination or cancellation of the Contract, in whole or in part, unless the successful Contractor is able to demonstrate within a reasonable time that it is in compliance with the DBE terms stated herein.

EMPLOYEE PROTECTIONS

49 U.S.C. § 5333(a)
40 U.S.C. §§ 3141 – 3148
29 C.F.R. part 5
18 U.S.C. § 874
29 C.F.R. part 3
40 U.S.C. §§3701-3708
29 C.F.R. part 1926

These requirements extend to all third party contractors and their contracts at every tier and subrecipients and their subcontracts at every tier.

Prevailing Wage and Anti-Kickback

For all prime construction, alteration or repair contracts in excess of $2,000 awarded by FTA, the Contractor shall comply with the Davis-Bacon Act and the Copeland "Anti-Kickback" Act. Under 49 U.S.C. § 5333(a), prevailing wage protections apply to laborers and mechanics employed on FTA assisted construction, alteration, or repair projects. The Contractor will comply with the Davis-Bacon Act, 40 U.S.C. §§ 3141-3144, and 3146-3148 as supplemented by DOL regulations at 29 C.F.R. part 5, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction." In accordance with the statute, the Contractor shall pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, the Contractor agrees to pay wages not less than once a week. The Contractor shall also comply with the Copeland "Anti-Kickback" Act (40 U.S.C. § 3145), as supplemented by DOL regulations at 29 C.F.R. part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in part by Loans or Grants from the United States." The Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. Refer to the Wage Determination Schedule.

Contract Work Hours and Safety Standards

For all contracts in excess of $100,000 that involve the employment of mechanics or laborers, the Contractor shall comply with the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701-3708), as supplemented by the DOL regulations at 29 C.F.R. part 5. Under 40 U.S.C. § 3702 of the Act, the Contractor shall compute the wages of every mechanic and laborer, including watchmen and guards, on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of

40 hours in the work week. The requirements of 40 U.S.C. § 3704 are applicable to construction work and provide that no laborer or mechanic be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchase of supplies or materials or articles ordinarily available on the open market, or to contracts for transportation or transmission of intelligence.

In the event of any violation of the clause set forth herein, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, the Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of this clause in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by this clause.

The FTA shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in this section.

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this agreement.

Contract Work Hours and Safety Standards for Awards Not Involving Construction
The Contractor shall comply with all federal laws, regulations, and requirements providing wage and hour protections for non-construction employees, in accordance with 40 U.S.C. § 3702, Contract Work Hours and Safety Standards Act, and other relevant parts of that Act, 40 U.S.C. § 3701 *et seq.*, and U.S. DOL regulations, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Non-construction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. part 5.

The Contractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three (3) years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

Such records maintained under this paragraph shall be made available by the Contractor for inspection, copying, or transcription by authorized representatives of the FTA and the

Department of Labor, and the Contractor will permit such representatives to interview employees during working hours on the job.

The contractor shall require the inclusion of the language of this clause within subcontracts of all tiers.

ENERGY CONSERVATION

42 U.S.C. 6321 *et seq*.
49 C.F.R. part 622, subpart C

The Energy Policy and Conservation requirements are applicable to all contracts at every tier.

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency, which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

GOVERNMENT-WIDE DEBARMENT AND SUSPENSION

2 C.F.R. part 180
2 C.F.R part 1200
2 C.F.R. § 200.213
2 C.F.R. part 200 Appendix II (I)
Executive Order 12549
Executive Order 12689

The Contractor shall comply and facilitate compliance with U.S. DOT regulations, "Nonprocurement Suspension and Debarment," 2 C.F.R. part 1200, which adopts and supplements the U.S. Office of Management and Budget (U.S. OMB) "Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," 2 C.F.R. part 180. These provisions apply to each contract at any tier of $25,000 or more, and to each contract at any tier for a federally required audit (irrespective of the contract amount), and to each contract at any tier that must be approved by an FTA official irrespective of the contract amount. As such, the Contractor shall verify that its principals, affiliates, and subcontractors are eligible to participate in this federally funded contract and are not presently declared by any Federal department or agency to be:

a) Debarred from participation in any federally assisted Award;

b) Suspended from participation in any federally assisted Award;

c) Proposed for debarment from participation in any federally assisted Award;

d) Declared ineligible to participate in any federally assisted Award;

e) Voluntarily excluded from participation in any federally assisted Award; or

f) Disqualified from participation in ay federally assisted Award.

The City of Jacksonville will conduct due diligence to ensure that Contractors proposed for contract award are not debarred from doing business with the State of North Carolina either. The City of Jacksonville will consult http://www.pandc.nc.gov/actions.aspx prior to contract award.

Refer to Attachment D – Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transaction which is required to be submitted with the bid or proposal.

LOBBYING RESTRICTIONS

31 U.S.C. § 1352
2 C.F.R. § 200.450
2 C.F.R. part 200 appendix II (J)
49 C.F.R. part 20

The lobbying requirements apply to all contracts and subcontracts of $100,000 or more at any tier under a Federal grant. 49 C.F.R. part 20, Appendices A and B provide specific language for inclusion in FTA funded third party contracts. Attachment A – Certification Regarding Lobbying is required to be submitted with the bid.

NO GOVERNMENT OBLIGATION TO THIRD PARTIES

The City of Jacksonville and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying Contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this Contract and shall not be subject to any obligations or liabilities to the City of Jacksonville, Contractor or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying Contract. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by the FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTS

49 U.S.C. § 5323(l)(1)
31 U.S.C. §§ 3801-3812
18 U.S.C. § 1001
49 C.F.R. part 31

The Program Fraud clause applies to all third party contracts that are federally funded.

The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 *et seq*. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a

contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. chapter 53, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5323(l) on the Contractor, to the extent the Federal Government deems appropriate.

The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

RECYCLED PRODUCTS

42 U.S.C. § 6962
40 C.F.R. part 247
2 C.F.R. part § 200.322

These requirements extend to all third party contractors and their contracts at every tier and subrecipients and their subcontracts at every tier where the value of an EPA designated item exceeds $10,000.

The Contractor agrees to provide a preference for those products and services that conserve natural resources, protect the environment, and are energy efficient by complying with and facilitating compliance with Section 6002 of the Resource Conservation and Recovery Act, as amended, 42 U.S.C. § 6962, and U.S. Environmental Protection Agency (U.S. EPA), "Comprehensive Procurement Guideline for Products Containing Recovered Materials," 40 C.F.R. part 247.

SAFE OPERATION OF MOTOR VEHICLES

23 U.S.C. part 402
Executive Order No. 13043
Executive Order No. 13513
U.S. DOT Order No. 3902.10

The Safe Operation of Motor Vehicles requirements flow down to all third party contractors at every tier.

Seat Belt Use

The Contractor is encouraged to adopt and promote on-the-job seat belt use policies and programs for its employees and other personnel that operate company-owned vehicles, company-rented vehicles, or personally operated vehicles. The terms "company-owned" and "company-leased" refer to vehicles owned or leased either by the Contractor or City of Jacksonville.

Distracted Driving

The Contractor agrees to adopt and enforce workplace safety policies to decrease crashes caused by distracted drivers, including policies to ban text messaging while using an electronic device supplied by an employer, and driving a vehicle the driver owns or rents, a vehicle Contactor owns, leases, or rents, or a privately-owned vehicle when on official business in connection with the work performed under this agreement.

SEISMIC SAFETY

42 U.S.C. § 7701 et seq.
49 C.F.R. part 41
Executive Order (E.O.) 12699

The Seismic Safety requirements apply only to contracts for the construction of new buildings or additions to existing buildings. Only first tier contractors must assure compliance with the applicable standards for Seismic Safety, including the work performed by all subcontractors.

The contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation (DOT) Seismic Safety Regulations 49 C.F.R. part 41 and will certify to compliance to the extent required by the regulation. The contractor also agrees to ensure that all work performed under this contract, including work performed by a subcontractor, is in compliance with the standards required by the Seismic Safety regulations and the certification of compliance issued on the project.

TERMINATION

2 C.F.R. § 200.339
2 C.F.R. part 200, Appendix II (B)

All contracts in excess of $10,000 must address termination for cause and for convenience, including the manner by which it will be effected and the basis for settlement.

Refer to General Conditions for specific information regarding termination.

VIOLATION AND BREACH OF CONTRACT

2 C.F.R. § 200.326
2 C.F.R. part 200, Appendix II (A)

All contracts in excess of the Simplified Acquisition Threshold (currently set at $150,000) shall contain administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate. This clause applies to all third party contractors and their contracts at every tier.

Refer to General Conditions for specific information regarding violation and breach of contract.

Attachment A – Certification Regarding Lobbying

(To be submitted with each bid or offer exceeding $100,000)

The undersigned_____certifies, to the best of his or her knowledge and belief, that: (Contractor)

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any persons for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding to any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant loan, or cooperative agreement, the undersigned shall complete and submit Standard Form- LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104- 65, to be codified at 2 U.S.C. 1601, *et seq* .)]
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance is placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 for each such expenditure or failure.]

The Contractor,_____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Section A 3801 *et seq*. apply to this certification and disclosure, if any.

_____ _____

Date Signature of Contractor's Authorized Official

_____

Name and Title of Contractors Authorized Official

Subscribed and sworn to before me this_____day of_____, 20___, in the State of_____, and the County of_____.

Notary Public _____ My Appointment Expires _____

City of Jacksonville
Supplementary Conditions January 2020
Jacksonville Station Bid No. FY 20-07**A**

Attachment B - Buy America Compliance Certification

(To be submitted with all bids exceeding $100,000. A bid, which does not include this certification or the certification under Attachment C, will not be eligible for award.)

The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 C.F.R. Part 661.

DATE _____

SIGNATURE _____

COMPANY _____

NAME _____

State of _____

County of _____

Subscribed and sworn to before me this_____day of_____, 20 _____.

Notary Public _____

My Appointment Expires _____

Attachment C - Buy American Non-Compliance Certification

(To be submitted with all bids exceeding $100,000. A bid, which does not include this certification or the certification under Attachment B, will not be eligible for award.)

The bidder hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j), but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2), as amended, and the applicable regulation in 49 CFR Part 661.7.

DATE _____

SIGNATURE _____

COMPANY _____

NAME _____

TITLE _____

State of _____

County of _____

Subscribed and sworn to before me this _____day of _____, 20_____.

Notary Public _____

My Appointment Expires _____

Attachment D – Debarment, Suspension, Ineligibility Certification

(To be submitted with all bids exceeding $25,000.)

(1) The prospective lower tier participant (Bidder/Contractor) certifies, by submission of this bid or proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) The prospective Bidder/Contractor also certifies by submission of this bid or proposal that all subcontractors and suppliers (this requirement flows down to all subcontracts at all levels) are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(3) Where the prospective lower tier participant (Bidder/Contractor) is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this bid or proposal.

The lower tier participant (Bidder/Contractor),_____, certifies or affirms the truthfulness and accuracy of this statement of its certification and disclosure, if any.

DATE_____

SIGNATURE_____

COMPANY_____

NAME_____

TITLE_____

State of _____

County of_____

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary Public_____

My Appointment Expires_____

Attachment E – DBE Utilization Form

The undersigned Bidder/Offeror has satisfied the requirements of the solicitation in the following manner (please check the appropriate space):

_____ The Bidder/Offer is committed to a minimum of _____% DBE utilization on this contract.

_____ The Bidder/Offeror (if unable to meet the DBE goal of %) is committed to a minimum

of _____% DBE utilization on this contract and submits documentation demonstrating good faith efforts.

DBE PARTICIPATION SCHEDULE
The Bidder/Offeror shall complete the following information for all DBE's participating in the contract that comprises the DBE Utilization percent stated in the DBE Utilization Form. The Bidder/Offeror shall also furnish the name and telephone number of the appropriate contact person should the Authority have any questions in relation to the information furnished herein.

DBE IDENTIFICATION AND INFORMATION FORM

Name and Address	Contact Name and Telephone Number	Participation Percent (Of Total Contract Value)	Description Of Work To Be Performed	Race and Gender of Firm

Attachment F – Letter of Intent Perform as Subcontractor

Contract:	Name of Bidder:
Jacksonville Station	

The undersigned intends to perform work in connection with the above contract upon execution of the bid and subsequent award of contract by the City of Jacksonville as:

Name of MBE/WBE/DBE Subcontractor_____

Address_____

City_____State_____Zip_____

Check all that apply:

☐ Minority Business Enterprise (MBE) ☐ Women Business Enterprise (WBE)

☐ Disadvantages Business Enterprise (DBE)

The MBE /WBE /DBE status of the above named subcontractor is certified by the North Carolina Department of Transportation. The above named subcontractor is prepared to perform the described work listed on the attached MBE/WBE/DBE Commitment Items sheet, in connection with the above contract upon execution of the bid and subsequent award of contract by the City of Jacksonville. The above named subcontractor is prepared to perform the described work at the estimated Commitment Total for Subcontractor Price identified on the MBE/WBE/DBE Commitment Items sheet and amount indicated below.

Commitment Total based on estimated Unit Prices and Quantities on the "attached" MBE/WBE/DBE Commitment Items sheet. Amount $ _____

The above named bidder and subcontractor mutually accepts the Commitment Total estimated for the Unit Prices and Quantities. This commitment total is based on estimated quantities only and most likely will vary up or down as the project is completed. Final compensation will be based on actual quantities of work performed and accepted during the pursuance of work. The above listed amount represents the entire dollar amount quoted based on these estimated quantities. No conversations, verbal agreements, and/or other forms of non-written representations shall serve to add, delete, or modify the terms as stated.

This document shall not serve in any manner as an actual subcontract between the two parties. A separate subcontractor agreement will describe in detail the contractual obligations of the bidder and the MBE/WBE/DBE subcontractor.

The above named MBE/ WBE/ DBE subcontractor affirms that it will perform the portion(s) of the contract for the estimated dollar value as stated above.

Name of MBE/ WBE/ DBE Subcontracto	**Name of Bidder**
Signature / Title	**Signature / Title**
Date	**Date**

Attachment G – Affidavit of No Change for DBE Businesses

I_____, declare that there have been no changes in
(insert name of DBE firm owner)

_____circumstances affecting its ability to meet the size, disadvantaged status,
(insert name of DBE firm)

ownership, or control requirements of 49 CFR Part 26 and Part 23 and 13 CFR Part 121. I further declare there have been no material changes in the information provided with

_____application for certification, except for any changes about
(insert name of DBE firm)

which I have proved written notice to_____pursuant to 49 CFR part 26.83(i).
(insert name of home state)

I declare that I am socially disadvantaged because I have been subjected to racial or ethnic prejudice or cultural bias, or have suffered the effects of discrimination, because of my identity as a member of one or more of the groups identified in 49 CFR Part 26.5, without regard to my individual qualities. I further declare that I am economically disadvantaged because my ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to other sin the same or similar line of business who are not socially and economically disadvantaged.

In addition, I specifically declare that_____continues to meet the Small
(insert name of DBE firm)

Business Administration (SBA) business size criteria and the overall gross receipts cap of 49 CFR Part 26 and Part 23. I specifically declare that_____average annual gross
(insert name of DBE firm)

receipts (as defined by SBA rules) over the previous three fiscal years do not exceed

_____. I provide the attached size and gross receipts documentation to
(insert dollar amount/no. of employees)

support this declaration (i.e. Federal personal and business taxes).

I declare under penalty of perjury that the foregoing is true and correct.[1]

Executed on _____

Signature _____

[1] Knowingly and willfully providing false information to the Federal government is a violation of 18 U.S.C. Section 1001 (False Statements) and could subject you to fines, imprisonment or both.

EMPLOYEE RIGHTS
UNDER THE DAVIS-BACON ACT
FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES	You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.
OVERTIME	You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.
ENFORCEMENT	Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.
APPRENTICES	Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.
PROPER PAY	If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

Deanna Trebil
Project Manager
City of Jacksonville
PO Box 128
Jacksonville, NC 28541
(910) 938-5073
dtrebil@jacksonvillenc.gov

or contact the U.S. Department of Labor's Wage and Hour Division.

For additional information:
1-866-4-USWAGE
(1-866-487-9243) TTY: 1-877-889-5627
WWW.WAGEHOUR.DOL.GOV

DERECHOS DEL EMPLEADO
BAJO LA LEY DAVIS-BACON
PARA OBREROS Y MECÁNICOS EMPLEADOS EN PROYECTOS DE CONSTRUCCIÓN FEDERAL O CON ASISTENCIA FEDERAL

LA SECCIÓN DE HORAS Y SUELDOS DEL DEPARTAMENTO DE TRABAJO DE EEUU

SALARIOS PREVALECIENTES No se le puede pagar menos de la tasa de pago indicada en la Decisión de Salarios Davis-Bacon fijada con este Aviso para el trabajo que Ud. desempeña.

SOBRETIEMPO Se le ha de pagar no menos de tiempo y medio de su tasa básica de pago por todas las horas trabajadas en exceso de 40 en una semana laboral. Existen pocas excepciones.

CUMPLIMIENTO Se pueden retener pagos por contratos para asegurarse que los obreros reciban los salarios y el pago de sobretiempo debidos, y se podría aplicar daños y perjuicios si no se cumple con las exigencias del pago de sobretiempo. Las cláusulas contractuales de Davis-Bacon permiten la terminación y exclusión de contratistas para efectuar futuros contratos federales hasta tres años. El contratista que falsifique los registros certificados de las nóminas de pago o induzca devoluciones de salarios puede ser sujeto a procesamiento civil o criminal, multas y/o encarcelamiento.

APRENDICES Las tasas de aprendices sólo se aplican a aprendices correctamente inscritos bajo programas federales o estatales aprobados.

PAGO APROPIADO Si Ud. no recibe el pago apropiado, o precisa de información adicional sobre los salarios aplicables, póngase en contacto con el Contratista Oficial que aparece abajo:

Deanna Trebil
Project Manager
City of Jacksonville
PO Box 128
Jacksonville, NC 28541
(910) 938-5073
dtrebil@jacksonvillenc.gov

o póngase en contacto con la Sección de Horas y Sueldos del Departamento de Trabajo de EEUU.

Para obtener información adicional:
1-866-4-USWAGE
(1-866-487-9243) TTY: 1-877-889-5627
WWW.WAGEHOUR.DOL.GOV

WHD U.S. Wage and Hour Division

EMPLOYEE RIGHTS

UNDER THE FAIR LABOR STANDARDS ACT

FEDERAL MINIMUM WAGE

$7.25 PER HOUR

BEGINNING JULY 24, 2009

The law requires employers to display this poster where employees can readily see it.

OVERTIME PAY At least 1½ times the regular rate of pay for all hours worked over 40 in a workweek.

CHILD LABOR An employee must be at least 16 years old to work in most non-farm jobs and at least 18 to work in non-farm jobs declared hazardous by the Secretary of Labor. Youths 14 and 15 years old may work outside school hours in various non-manufacturing, non-mining, non-hazardous jobs with certain work hours restrictions. Different rules apply in agricultural employment.

TIP CREDIT Employers of "tipped employees" who meet certain conditions may claim a partial wage credit based on tips received by their employees. Employers must pay tipped employees a cash wage of at least $2.13 per hour if they claim a tip credit against their minimum wage obligation. If an employee's tips combined with the employer's cash wage of at least $2.13 per hour do not equal the minimum hourly wage, the employer must make up the difference.

NURSING MOTHERS The FLSA requires employers to provide reasonable break time for a nursing mother employee who is subject to the FLSA's overtime requirements in order for the employee to express breast milk for her nursing child for one year after the child's birth each time such employee has a need to express breast milk. Employers are also required to provide a place, other than a bathroom, that is shielded from view and free from intrusion from coworkers and the public, which may be used by the employee to express breast milk.

ENFORCEMENT The Department has authority to recover back wages and an equal amount in liquidated damages in instances of minimum wage, overtime, and other violations. The Department may litigate and/or recommend criminal prosecution. Employers may be assessed civil money penalties for each willful or repeated violation of the minimum wage or overtime pay provisions of the law. Civil money penalties may also be assessed for violations of the FLSA's child labor provisions. Heightened civil money penalties may be assessed for each child labor violation that results in the death or serious injury of any minor employee, and such assessments may be doubled when the violations are determined to be willful or repeated. The law also prohibits retaliating against or discharging workers who file a complaint or participate in any proceeding under the FLSA.

ADDITIONAL INFORMATION

- Certain occupations and establishments are exempt from the minimum wage, and/or overtime pay provisions.
- Special provisions apply to workers in American Samoa, the Commonwealth of the Northern Mariana Islands, and the Commonwealth of Puerto Rico.
- Some state laws provide greater employee protections; employers must comply with both.
- Some employers incorrectly classify workers as "independent contractors" when they are actually employees under the FLSA. It is important to know the difference between the two because employees (unless exempt) are entitled to the FLSA's minimum wage and overtime pay protections and correctly classified independent contractors are not.
- Certain full-time students, student learners, apprentices, and workers with disabilities may be paid less than the minimum wage under special certificates issued by the Department of Labor.

WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

1-866-487-9243
TTY: 1-877-889-5627
www.dol.gov/whd

WH1088 REV 07/16

"General Decision Number: NC20190038 09/13/2019

Superseded General Decision Number: NC20180038

State: North Carolina

Construction Type: Building

County: Onslow County in North Carolina.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the

federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/04/2019
1	09/13/2019

IRON0848-005 02/01/2018

	Rates	Fringes
IRONWORKER, STRUCTURAL	$ 25.00	13.50

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* PLUM0421-003 07/01/2018

	Rates	Fringes
PIPEFITTER	$ 28.00	12.01

SUNC2011-019 08/24/2011

	Rates	Fringes
BRICKLAYER	$ 19.00	0.00
CARPENTER (Drywall Hanging Only)	$ 13.83	0.00
CARPENTER (Form Work Only)	$ 13.38	1.80
CARPENTER, Excludes Drywall Hanging, and Form Work	$ 16.39	4.26

CEMENT MASON/CONCRETE FINISHER	$ 15.80	0.00
ELECTRICIAN	$ 20.64	6.68
HVAC MECHANIC (HVAC Duct Installation Only)	$ 17.37	1.82
LABORER: Common or General	$ 11.13	0.32
LABORER: Landscape & Irrigation	$ 9.13	0.28
LABORER: Pipelayer	$ 13.35	2.80
LABORER: Mason Tender-Brick/Cement/Concrete	$ 12.00	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 18.47	2.41
OPERATOR: Bulldozer	$ 16.00	1.87
OPERATOR: Crane	$ 19.77	4.48
OPERATOR: Forklift	$ 13.86	0.00
OPERATOR: Grader/Blade	$ 15.72	1.49
OPERATOR: Loader	$ 16.17	0.25
PAINTER: Brush, Roller and Spray	$ 12.35	0.00
PLUMBER	$ 18.48	3.93
ROOFER	$ 11.75	1.06

SHEET METAL WORKER, Excludes
HVAC Duct Installation.....$ 15.81 1.40

TRUCK DRIVER.....$ 13.38 1.48

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that

classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION"

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division

Rev. Dec. 2008

OMB No.: 1235-0008
Expires: 02/28/2018

NAME OF CONTRACTOR ☐ OR SUBCONTRACTOR ☐ | ADDRESS

PAYROLL NO. | FOR WEEK ENDING | PROJECT AND LOCATION | PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE HOURS WORKED EACH DAY	TOTAL HOURS	(5)	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS FICA	WITH-HOLDING TAX		OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
			O S											
			O S											
			O S											
			O S											
			O S											
			O S											
			O S											

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(i) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that is will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

Date _____

I, _____ (Name of Signatory Party) _____ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ (Contractor or Subcontractor) _____ on the

_____ (Building or Work); that during the payroll period commencing on the

_____ day of _____, _____, and ending the _____ day of _____, _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ (Contractor or Subcontractor) _____ from the full

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

_____

_____

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE

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STANDARD CITY FORMS

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

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City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Notice of Award

TO: _____
_____
_____
_____

PROJECT DESCRIPTION: Jacksonville Station Bid No. FY 20-07**A**

The CITY has considered the bid submitted by you for the above project in response to its advertisement for bids dated _____ and the Instruction to Bidders.

You are hereby notified that your bid has been accepted for items in the amount of **$** .

You are now required by the Contract Documents to execute the Agreement and furnish original Insurance Certificates and Performance and Payment Bonds within ten (10) calendar days from the date of this notice to you. Certificates and Bonds with attached Power of Attorney must be provided by companies licensed and authorized, respectively, to do business in the State of North Carolina.

If you fail to execute said agreement and to furnish said Certificates and Bonds within ten days from the date of this notice, the City will be entitled to consider all your rights arising out of the City's acceptance of your bid as abandoned. The City will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the City.

Dated this _____ day of _____, 202____.

CITY OF JACKSONVILLE, N.C.

By:_____

ACCEPTANCE OF NOTICE

Receipt of the Above NOTICE OF AWARD is hereby acknowledged this the _____ day of _____, 202__.

BY:_____
Signature

TITLE:_____

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

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City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Notice to Proceed

TO: _____
_____
_____
_____

PROJECT: Jacksonville Station Bid No. FY 20-07A

YOU ARE HEREBY NOTIFIED TO COMMENCE WORK ON THE ABOVE NAMED PROJECT IN ACCORDANCE WITH THE AGREEMENT DATED _____ON OR BEFORE _____ AND TO COMPLETE THE WORK NECESSARY FOR SUBSTANTIAL COMPLETION WITHIN **THREE HUNDRED SIXTY FIVE (365)** CALENDAR DAYS THEREAFTER ON OR BEFORE _____AND COMPLETE THE WORK NECESSARY FOR FINAL COMPLETION WITHIN **THREE HUNDRED NINETY FIVE(395)** CALENDAR DAYS THEREAFTER ON OR BEFORE.

CITY OF JACKSONVILLE

BY: _____
Richard L. Woodruff, City Manager

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE TO PROCEED IS HEREBY ACKNOWLEDGED BY:

_____

BY: _____
Signature

TITLE: _____

DATE: _____

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City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Construction Contract Progress
Payment Request Summary

DATE:_____

CITY BID#:	Bid No. FY 20-07**A**	
PROJECT NAME: :	Jacksonville Station	
		PAYMENT No
P.O. No:		FROM:
CONTRACTOR:		TO:
INITIAL CONTRACT PRICE:		$
TOTAL CHANGE ORDERS: _____		$
TOTAL CURRENT CONTRACT PRICE		$
WORK PERFORMED TO DATE		$
LESS RETAINAGE		$
AMOUNT DUE FOR WORK PERFORMED		$
MATERIALS ON HAND (TOTAL PRESENT)		$
LESS RETAINAGE		$
AMOUNT DUE FOR MATERIALS		$
GROSS AMOUNT DUE		$
LESS PREVIOUS PAYMENTS		$
CURRENT AMOUNT DUE		**$** _____

I find that the quantities, prices, and costs associated with the above referenced request are in accordance with the contract and that the work for which payment is requested has been completed. I, therefore, request payment of the **CURRENT AMOUNT DUE** indicated above.

CONTRACTOR'S AFFIDAVIT

Signed:_____

Typed:_____

Title:_____

Date:_____

ENGINEER_____

Signed:_____

Date:_____

CITY OF JACKSONVILLE_____

Signed_____

Date:_____

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

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PROGRESS PAYMENT FORM FOR PRIME CONTRACTORS/CONSULTANTS

Prompt Payment Affidavit

To be completed by the prime contractor/consultant and to be submitted each time a payment is requested.

Project Name:_____

Contractor's Name:_____

Date:_____ PO #:_____ Payment Number:_____

Name of Subcontractors/ Suppliers/ Services	Original Contract Amount	Change Order $ Amounts	Total Contract Amount	Total Payment to Date	Payment for this Period	Balance Remaining in Project

Under penalty of perjury, the undersigned agrees that the foregoing instrument is true and correct.

Name:_____ Date:_____

Title:_____

Signature:_____

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

NCDOR

Web-Fill
7-18

E-589CI
Affidavit of Capital Improvement

Form E-589CI, Affidavit of Capital Improvement, may be used to substantiate that a contract, or a portion of work to be performed to fulfill a contract, is to be taxed for sales and use tax purposes, as a real property contract for a capital improvement to real property.

The receipt of an affidavit of capital improvement for services to real property, absent fraud or other egregious activities, establishes that the subcontractor or other person receiving the affidavit should treat the transaction as a real property contract for sales and use tax purposes.

A real property contract is a contract between a real property contractor and another person to perform a capital improvement to real property.

Section I. Single Use *(Complete this section to issue the affidavit for a single capital improvement.)*

A

Owner, Lessee//Tenant, or Real Property Contractor

City of Jacksonville, NC

Address

815 New Bridge Street

City Jacksonville | **State** NC | **Zip Code** 28540

B

Real Property Contractor *(General Contractor or Subcontractor)* *Hired to perform capital improvement*

Addres

City **State** **Zip Code**

Describe capital improvement to be performed:

Construction of a new bus transit facility with an approximately 15,000 square foot transit/administration building and associated bus unloading/loading area.

Project Name: Jacksonville Station

Project Address (where the work is to be performed): **1300 North Marine Blvd** **City: Jacksonville** **State: NC** **Zip Code: 28540**

I certify that, to the best of my knowledge, this affidavit is accurate and complete and that the transaction described to be performed by the Real Property Contractor (General Contractor or Subcontractor identified in box "B") shall be treated as a real property contract for a capital improvement to real property for sales and use tax purposes. I understand that if it is determined that I issued this affidavit in error and the transaction is subject to sales tax as a retail sale of repair, maintenance, and installation services to real property, I will be liable for payment of any additional taxes determined to be due.

Signature of Authorized Person: Title: Date:

Section II. Blanket Use *(Complete this section to execute a blanket affidavit for capital improvements.)*

C

Real Property Contractor

Address

City **State** **Zip Code**

D

Real Property Contractor or Subcontractor *Hired to perform capital improvement*

Address

City **State** **Zip Code**

To be completed by the Real Property Contractor identified in Box C.

I certify that I am a Real Property Contractor who performs capital improvements to real property and all transactions with the real property contractor (subcontractor) identified in box "D" shall be treated as real property contracts for capital improvements to real property for sales and use tax purposes. I understand that if it is determined that I issued this affidavit in error and the transaction is subject to sales tax as a retail sale of repair, maintenance, and installation services to real property, I will be liable for payment of any additional taxes determined to be due.

Signature of Authorized Person: Title: Date:

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Affidavit of Capital Improvement Instructions

Form E-589CI, Affidavit of Capital Improvement, may be issued to substantiate that a contract, or a portion of work performed to fulfill a contract, is a capital improvement to real property and subject to sales and use tax as a real property contract. Generally, services to real property are retail sales of or the gross receipts derived from repair, maintenance, and installation services, unless a person substantiates that a transaction is subject to tax as a real property contract, subject to tax as a mixed transaction contract, or the transaction is not subject to sales and use tax. A "real property contract" is a contract between a real property contractor and another person to perform a capital improvement to real property.

A mixed transaction contract is a contract that includes both a real property contract for a capital improvement and repair, maintenance, and installation services for real property that are not related to the capital improvement. For a mixed transaction contract, if the allocated sales price of the taxable repair, maintenance, and installation services included in the contract is less than or equal to twenty-five percent (25%) of the contract price, then the repair, maintenance, and installation services portion of the contract, and the tangible personal property, digital property, or service used to perform those services, are taxable as a real property contract for sales and use tax purposes.

- A person that issues Form E-589CI is liable for any additional tax due on the transaction in excess of tax paid on purchases pursuant to N.C. Gen. Stat. § 105- 164.4H(a), if it is determined that the transaction is not a capital improvement, but rather the transaction is subject to tax as a retail sale.
- A person who receives Form E-589CI from another person, absent fraud or other egregious activities, is not liable for any additional tax on the gross receipts from the transaction if it is determined that the transaction is not a capital improvement.
- Form E-589CI **is not an affidavit of tax paid** on tangible personal property, or digital property purchased or used to fulfill a real property contract.
- Form E-589CI may not to be used to purchase tangible personal property, or digital property exempt from sales and use tax.

Exceptions from the Issuance of Form E-589CI to Establish a Transaction is to be Taxed as a Real Property Contract

In lieu of issuing an affidavit of capital improvement, a person may substantiate by other records that a transaction is a real property contract or a mixed transaction contract subject to tax as a real property contract, as discussed above, for a capital improvement to real property. However, where subcontractors are involved, it may be in the best interest of all parties to use Form E-589CI to ensure proper application of the sales and use tax laws.

Section I. Single Use Instructions

A person may complete "Section I - Single Use" for a one time use to substantiate that a transaction is a real property contract for a single capital improvement to real property and subject to sales and use tax as a real property contract. When a real property contractor hires a subcontractor to perform a portion of the overall real property contract and there is not a recurring business relationship between the two parties (when a period of no more than twelve months elapse between transactions between two parties), "Section I – Single Use" may be completed and the form issued to the subcontractor as notice that the transaction is subject to sales and use tax as a real property contract.

The following scenarios are for reference to assist a person to complete and issue Form E-589CI. The scenarios presented are not intended to cover all possible uses of the form.

A property owner oversees the entire activity to real property that is a real property contract for a capital improvement to real property. The property owner hires various subcontractors to complete the real property contract or portions thereof:

- **Box A - Owner, Lessee/Tenant or Real Property Contractor:** Enter property owner's name and address.
- **Box B - Real Property Contractor** *(General Contractor or Subcontractor)*: Enter a single subcontractor's name and address.
- Owner listed in Box A must describe the real property contract activity to be performed.
- Owner listed in Box A must enter the project address (if different than the address entered in Box A).
- Authorized Person (owner) signs, enters title (owner), enters the date, and issues to the person listed in Box B.

A property owner hires a general contractor to oversee the entire activity to real property that is a real property contract for a capital improvement to real property. The general contractor hires a subcontractor to perform the real property contract, or portion thereof:

- **Box A - Owner, Lessee/Tenant or Real Property Contractor:** Enter general contractor's name and address.
- **Box B - Real Property Contractor** *(General Contractor or Subcontractor)*: Enter subcontractor's name and address.
- General contractor listed in Box A must describe the real property contract activity to be performed.
- General contractor listed in Box A must enter the project address.
- Authorized Person (general contractor) signs, enters title (general contractor), enters the date, and issues to the person listed in Box B.

A lessee/tenant hires a general contractor for the installation of equipment that is to be attached to real property and will be depreciated under the Internal Revenue Code:

- **Box A - Owner, Lessee/Tenant or Real Property Contractor:** Enter lessee/tenant's name and address.
- **Box B - Real Property Contractor** *(General Contractor or Subcontractor)*: Enter general contractor's name and address.
- Lessee or tenant listed in Box A must describe the capital improvement to be performed and indicate the equipment will be depreciated under the Internal Revenue Code.
- Authorized Person (typically lessee or tenant) signs, enters title (lessee or tenant), enters the date, and issues to the person listed in Box B.

Section II. Blanket Use Instructions

A real property contractor may complete "Section II – Blanket Use" and issue the form to another real property contractor (subcontractor) who is used **exclusively** to perform part, or all, of real property contracts with respect to capital improvements to real properties, where the parties have a recurring business relationship (when a period of no more than twelve months elapse between transactions between two parties). A blanket use affidavit continues in force so long as the real property contractor named in "Box C" and the real property contractor (subcontractor) named in "Box D" maintain a recurring business relationship or until the affidavit is withdrawn or otherwise notified by the issuer of the form.

The blanket use will generally apply for the following: (1) a builder who hires the same contractor(s) only for new construction; (2) a real property contractor who hires the same subcontractor(s) only for reconstruction; (3) a real property contractor who hires the same subcontractor(s) for remodeling or renovation and the activities performed by the subcontractor(s) for the other party are never repair, maintenance, and installation services for real property based on the contract or agreement between the parties; and (4) a real property contractor who exclusively hires the same subcontractor(s) to perform part, or all, of its real property contracts for capital improvements to real properties.

A general contractor or subcontractor hires a subcontractor that will replace the complete electrical wiring in all renovated homes:

- **Box C - Real Property Contractor:** Enter the hiring real property contractor's name and address.
- **Box D - Real Property Contractor** *(General Contractor or Subcontractor)*: Enter the hired subcontractor's name and address.
- Authorized person listed in Box C signs, enters title, enters the date, and issues to the person listed in Box D.

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Sales Tax Listing

The Sales Tax Affidavit Form has been revised in order to assist Contractors in completing the necessary information. This form must be submitted as is and unmodified. The Contractor shall type in the Project Name, Pay Request Number and the dates that span the invoices listed on the Sales Tax Listing Form. Once complete, print this form, sign and submit it with your pay application.

Project Name: _____

Owner: _____

TO ACCOMPANY PAY REQUEST NO.: _____

I hereby certify that during the period of _____ to _____ _____ (Name of Contractor or Subcontractor) paid North Carolina sales and use taxes $ - with respect to building materials, supplies, fixtures, and equipment which have become a part of or annexed to a building or structure erected, altered, or repaired by _____ (Name of Contractor or Subcontractor), and that the vendors from whom the property was purchased, the dates and numbers of the invoices covering the purchases, the total amount of the invoices of each vendor, the North Carolina sales and use taxes paid thereon, and the cost of the property withdrawn from warehouse stock and North Carolina sales and use taxes paid thereon are as set forth in the attachments hereto.

_____ _____

Signature Date

_____

Typed Title

Total N.C. Sales Tax 4.75% this Period: _____

Select the County from which material was delievered.

Once selected, the taxes will calculate based on the information you completed in the Sales Tax Listing Form.

Select County From Drop Down List	County % This Period	Special County % This Period	Transit Tax % This Period
(Name of County)	(Amount)	(Amount)	(Amount)
(Name of County)	(Amount)	(Amount)	(Amount)
(Name of County)	(Amount)	(Amount)	(Amount)
(Name of County)	(Amount)	(Amount)	(Amount)
(Name of County)	(Amount)	(Amount)	(Amount)

Total County Taxes This Period: $ -

Total Taxes (State and County) This Period: $ -

Revised June 2013 (dsy)

SALES TAX LISTING
NORTH CAROLINA STATE AND COUNTY SALES AND USE TAX

VENDOR: _____

PROJECT NAME: _____

PAY REQUEST #: _____

DATES COVERED: _____ to _____

DATE	NAME OF VENDOR	INVOICE #	INVOICE AMOUNT (EXCLUDING SALES TAX)	NAME OF COUNTY WHERE MATERIALS DELIVERED / PICKED-UP (Select One)	4.75% STATE TAX	2.00% COUNTY TAX	SPECIAL COUNTY TAX	TRANSIT TAX	TOTAL INVOICE AMOUNT (INCLUDING TAX)
					-				
					-				
					-				

CITY OF JACKSONVILLE

Requisition No.:

Contract / Purchase Change Order

Use the tab button to move across fields

☒ CONTRACT CHANGE ORDER ☐ PURCHASE ORDER CHANGE

PROJECT: **Jacksonville Station** DATE:

CONTRACTOR: CHANGE ORDER

P.O.#

ACCOUNT NUMBER: PROJECT NO:

Current Contract / P.O. Amount

Contract / P.O. Increase/Decrease

Contract Days New Contract / P.O. $0.00

Justification/Description of change:

The Above Changes Are Proposed/Acceptable:

Signature Date

** Contractor

Signature Date

** Engineer/Inspector

The Above Changes Are Recommended:

Signature Date

Department Head

Approval of Finance Officer:

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act.

Signature Date

Finance Director

The Above Changes Are Approved:

Signature Date

** City Manager

** These signatures are required for contract change orders only

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Affidavit of Payment
Of
Taxes, Labor and Materials

STATE OF NORTH CAROLINA
COUNTY OF ONSLOW

_____, BEING FIRST DULY SWORN, upon oath deposes and says:

I. That s/he is the Contractor for the construction of_____.

2. That there are no liens or taxes of any kind or character against said construction or premises for labor performed thereon or material furnished thereto.

3. The payment made herewith in the amount of $ _____ for a total payment of
$ _____ is payment in full for the work under this Contract and there are no further claims of any kind due.

By:_____
Signature

Typed: _____ Date: _____

Title: _____

Contractor's Name and Address:

_____

_____

_____

Subscribed and sworn to before me this the ___ day of _____, ____.

By: _____

Notary Public in and for the State of North Carolina residing in _____ County.

My Commission Expires:_____ SEAL

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Stored Materials Payment Request Summary

DATE: _____

PROJECT NAME: _____ PAYMENT NO. _____

P.O. NO.: _____ PAY PERIOD: _____

CONTRACTOR: _____ FROM: _____

TO: _____

COST OF MATERIALS ON HAND AT BEGINNING OF PERIOD:	$ -
COST OF MATERIALS RECEIVED DURING PERIOD:	$ -
SUBTOTAL:	$ -
COST OF MATERIALS USED DURING PERIOD:	$ -
COST OF MATERIALS ON HAND AT END OF PERIOD:	$ -

AFFIDAVIT

The undersigned Contractor hereby swears under penalty of perjury that all previous progress payments received from the OWNER on account of the above referenced Contract have been applied by the Contractor to discharge in full all obligations of the Contractor in connection with WORK or MATERIAL covered by prior partial payment requests under said Contract.

Signed: _____

Name: _____

Title: _____

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

MATERIALS STORED

CONTRACTOR: _____

P.O. NO. _____

PAYMENT NO. _____

ITEM	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL AMOUNT ($) OF INVOICE	ON HAND AT START OF PERIOD (# of Units)	RECEIVED DURING PERIOD (# of Units)	USED DURING PERIOD (# of Units)	MATERIALS ON HAND AT END OF PERIOD (Total # of Units)	MATERIALS ON HAND AT END OF PERIOD (Total $)
1										$ -
2										$ -
3										$ -
4										$ -
5										$ -
6										$ -
7										$ -
8										$ -
9										$ -
10										$ -
11										$ -
12										$ -
13										$ -
14										$ -
15										$ -
16										$ -
17										$ -
18										$ -
19										$ -
20										$ -
21										$ -
22										$ -
23										$ -
24										$ -
25										$ -
				TOTALS		-	-	-		$ -

Surety Company's
Written Consent Releasing Retainage

In order to comply with North Carolina General Statute 143-134.1, the City of Jacksonville developed this template for Surety Companies to use as an example of submitting written consent for either the release of retainage or to discontinue the withholding of retainage.

Therefore, this document submitted by _____
(Name of Surety Company) serves as written consent to either release retainage or to discontinue the withholding of retainage for _____
(Name of City Project). By signing below, this Surety Company is signifying that to date no outstanding issues or problems relating to above mentioned project has been identified.

By:_____
Authorized Signature

Typed:_____ Date:_____

Title:_____

Telephone Number:_____

Contractor's Name and Address:

_____

_____

_____

Please complete this form and FAX to the City of Jacksonville Engineering Division at (910) 938-5278. If you have any questions, please call (910) 938-5249.

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

Contractor's Final Release

This is to certify that _____,Contractor for Jacksonville Station has completed said Contract. This Contract with The City of Jacksonville as **OWNER** under which the work was performed was dated _____.

Further, this is to certify that Estimate No. _____ (FINAL) dated _____, in the amount of _____ including retainage, is acceptable and that when said estimate is approved, the Contractor will accept a check for the amount as full and final settlement for said Contract, and thereby release the **OWNER** from further liability thereon.

Further, that said work was fully completed in accordance with the plans and specifications therefore and that all taxes and all bills for labor and material incurred in completion thereof have been fully paid and satisfied except the following:

_____

_____

_____.

Further, Affiant hereby agrees to correct and/or replace workmanship, materials and/or equipment that may be found to be defective within eighteen (18) months after _____ in accordance with the guarantee provisions of the Contract.

Further, Affiant hereby agrees that any obligation arising from the Contractor's operation in connection with the above mentioned construction project or any claims which may be presented or any suit which may arise therefrom after this settlement will be borne by the Contractor and the **OWNER** is hereby held harmless therefrom.

CONTRACTOR:

BY:_____
Signature

TYPED:_____DATE:_____

TITLE:_____

Subscribed and sworn to before me this the ___ day of _____, 20___.

By:_____, Notary Public in and for the State of North Carolina residing in _____ County.

My Commission Expires: _____ SEAL

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

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City of Jacksonville
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January 2020

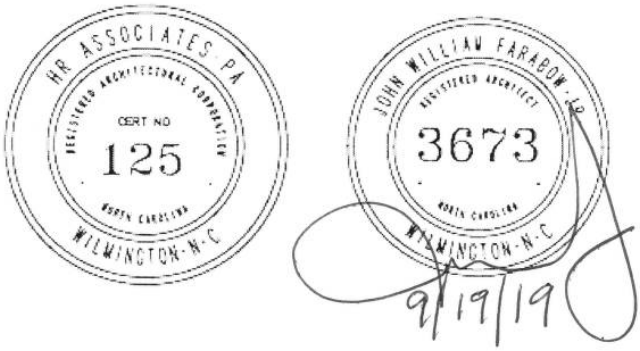
TECHNICAL SPECIFICATIONS

City of Jacksonville
Standard City Forms
Jacksonville Station Bid No. FY 20-07**A**

January 2020

CITY OF JACKSONVILLE
JACKSONVILLE STATION
1300 NORTH MARINE BOULEVARD/NC HWY 17
JACKSONVILLE, NORTH CAROLINA

COMPLETE SPECIFICATION



H R ASSOCIATES PA

ARCHITECTURE - PLANNING - INTERIOR DESIGN
2202 WRIGHTSVILLE AVENUE, SUITE 212
WILMINGTON, NORTH CAROLINA

10 JUNE 2019

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SERIES 0 BIDDING AND CONTRACT REQUIREMENTS AND CONTRACT FORMS

PROVIDED BY OWNER

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **WORK COVERED BY CONTRACT DOCUMENTS:**

1.2.1. The Project consists of a new City of Jacksonville transit facility named "Jacksonville Station".

1.2.1.1. Project Location(s): 1300 North Marine Boulevard/ NC Hwy 17
Jacksonville, North Carolina 28541

1.2.1.2. Owner: City of Jacksonville
815 New Bridge Street
Jacksonville, North Carolina 28540

1.2.2. Contract Documents dated 10 June 2019, Bid Drawings and Permit Revisions dated 10 January 2020, Site/Civil TRC Drawings dated 10 June 2019/27 September 2019, and Specification dated 10 June 2019 prepared for the project by H R Associates PA.

1.2.3. The Work consists of a new bus transit facility with an approximately 15,000 s.f. transit/administration building, and associated bus unloading/loading area.

1.2.3.1. The Work includes site clearing, earthwork, site drainage/stormwater, concrete/asphalt paving, landscaping, structural steel framing, light-gauge exterior/interior wall framing, shingle/sheet membrane roofing, miscellaneous metals, wall/roof and miscellaneous insulation, hollow metal frames, hollow metal/wood doors, door hardware, drywall, painting, acoustical ceilings, toilet partitions/accessories, millwork, along with associated plumbing, mechanical, electrical and fire alarm as shown on the drawings.

1.2.4. The Work will be constructed under a single contract.

1.3. **WORK SEQUENCE:**

1.3.1. The Work will be conducted in one phase.

1.4. **CONTRACTOR USE OF PREMISES:**

1.4.1. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.

1.5. **PRODUCTS:**

1.5.1. The Contractor will furnish products listed under "Schedule of Products" included at the end of this Section.

1.5.2. The Contractor will arrange and pay for delivery of items according to the Contractor's Construction Schedule.

1.5.3. Following delivery, the Contractor will inspect items delivered for damage.

1.5.4. If items are damaged, defective, or missing upon receiving the General Contractor will notify the Owner and arrange for replacement.

1.5.5. The Contractor will arrange for manufacturer's field services for the delivery of manufacturer's warranties to the Owner.

1.5.6. The Contractor shall designate delivery dates of items in the Contractor's Construction Schedule.

1.5.7. The Contractor shall review shop drawings, product data, and samples and return them to the Architect noting discrepancies or problems anticipated in use of the product.

1.5.8. The Contractor is responsible for receiving, unloading, handling and storing items at the site.

1.5.9. The Contractor is responsible for protecting and securing items from damage, including damage from exposure to the elements and theft. The Contractor shall repair or replace items damaged as a result of his operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01010

SECTION 01026 - UNIT PRICES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and procedural requirements for unit prices.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Modification Procedures" for procedures for submitting and handling Change Orders.

1.2.2.2. Division 2 Section "Earthwork" for procedures for measurement and payment for rock excavation.

1.3. **DEFINITIONS:**

1.3.1. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4. **PROCEDURES:**

1.4.1. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, profit, and applicable taxes.

1.4.2. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

1.4.3. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

1.4.4. The owner reserves the right to reject the contractor's unit prices in the "Bid Form" if deemed out of line with cost. If so elected, unit prices will be established at the time of materials or services to be added or deducted from the contract sum.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **UNIT PRICE SCHEDULE:**

3.1.1. Unit Price No. 1 - Earth Excavation: (Machine).

3.1.1.1 Description: Earth excavation in accordance with Section 02200 "Earthwork."

3.1.1.2 Unit of Measurement: Cubic yard of Earth excavated.

3.1.2. Unit Price No. 2 - Earth Excavation: (Hand).

3.1.2.1 Description: Earth excavation in accordance with Section 02200 "Earthwork".

3.1.2.2 Unit of Measurement: Cubic yard of Earth evacuated.

3.1.3. Unit Price No. 3 - A615-60 reinforcing in place:

3.1.3.1 Additional reinforcing steel in accordance with Section 03300 "Cast-In-Place Concrete".

3.1.3.2 Unit of Measurement: Weight of additional reinforcing steel.

3.1.4 Unit Price No. 4 - Offsite Fill, compacted in place:

3.1.4.1 Compacted fill material (from off-site) in accordance with Division 2 Section 02300 "Earthwork".

3.1.4.2 Unit of Measurement: Cubic yard.

END OF SECTION 01026

SECTION 01027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section.

1.2.2.1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Division 1 Section "Submittals."

1.3. **SCHEDULE OF VALUES:**

1.3.1. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

1.3.1.1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

1.3.1.1.1. Contractor's Construction Schedule.

1.3.1.1.2. Application for Payment forms, including Continuation Sheets.

1.3.1.1.3. List of subcontractors.

1.3.1.1.4. Schedule of alternates (if any).

1.3.1.1.5. List of products.

1.3.1.1.6. List of principal suppliers and fabricators.

1.3.1.1.7. Schedule of submittals.

1.3.1.2. Submit the Schedule of Values to the Architect at the earliest possible date but no later than ten (10) days before the date scheduled for submittal of the initial Applications for Payment.

1.3.2. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.

1.3.2.1. Identification: Include the following Project identification on the Schedule of Values:

1.3.2.1.1. Project name and location.

1.3.2.1.2. Name of the Architect.

1.3.2.1.3. Project number.

1.3.2.1.4. Contractor's name and address.

1.3.2.1.5. Date of submittal.

1.3.2.2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

1.3.2.2.1. Related Specification Section or Division.

1.3.2.2.2. Description of Work.

1.3.2.2.3. Name of subcontractor.

1.3.2.2.4. Name of manufacturer or fabricator.

1.3.2.2.5. Name of supplier.

1.3.2.2.6. Change Orders (approved) that affect value (if any).

1.3.2.2.7. Dollar value. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

1.3.2.3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.

1.3.2.4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.

1.3.2.5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.

1.3.2.5.1. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

1.3.2.6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

1.3.2.7. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

1.3.2.7.1. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

1.3.2.8. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract sum.

1.4. **APPLICATIONS FOR PAYMENT:**

1.4.1. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.

1.4.1.1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.

1.4.2. Payment-Application Times: The date for each progress payment is the 25th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 10 days prior to the date for each progress payment.

1.4.3. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment.

1.4.4. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.

1.4.4.1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.

1.4.4.2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

1.4.5. Transmittal: Submit electronic/digital signed and notarized of each Application for Payment to the Owner and Architect. Complete, including waivers of lien and similar attachments, when required.

1.4.5.1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.

1.4.6. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application.

1.4.6.1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

1.4.6.2. When an application shows completion of an item, submit final or full waivers.

1.4.6.3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

1.4.7. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:

1.4.7.1. List of subcontractors.

1.4.7.2. List of principal suppliers and fabricators.

1.4.7.3. Schedule of Values.

1.4.7.4. Contractor's Construction Schedule (updated).

1.4.7.5. Schedule of principal products.

1.4.7.6. Schedule of unit prices.

1.4.7.7. Submittal Schedule (preliminary if not final).

1.4.7.8. List of Contractor's staff assignments.

1.4.7.9. List of Contractor's principal consultants.

1.4.7.10. Copies of building permits.

1.4.7.11. Copies of authorizations and licenses from governing authorities for performance of the Work.

1.4.7.12. Initial progress report.

1.4.7.13. Report of preconstruction meeting.

1.4.7.14. Certificates of insurance and insurance policies.

1.4.8. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1.4.8.1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

1.4.8.2. Administrative actions and submittals that shall precede or coincide with this application include:

1.4.8.2.1. Occupancy permits and similar approvals.

1.4.8.2.2. Warranties (guarantees) and maintenance agreements.

1.4.8.2.3. Test/adjust/balance records.

1.4.8.2.4. Maintenance instructions.

1.4.8.2.5. Meter readings.

1.4.8.2.6. Startup performance reports.

1.4.8.2.7. Changeover information related to Owner's occupancy, use, operation, and maintenance.

1.4.8.2.8. Final cleaning.

1.4.8.2.9. Application for reduction of retainage and consent of surety.

1.4.8.2.10. Advice on shifting insurance coverages.

1.4.8.2.11. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

1.4.9. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:

1.4.9.1. Completion of Project closeout requirements.

1.4.9.2. Completion of items specified for completion after Substantial Completion.

1.4.9.3. Ensure that unsettled claims will be settled.

1.4.9.4. Ensure that incomplete Work is not accepted and will be completed without undue delay.

1.4.9.5. Transmittal of required Project construction records to the Owner.

1.4.9.6. Certified property survey.

1.4.9.7. Proof that taxes, fees, and similar obligations were paid.

1.4.9.8. Removal of temporary facilities and services.

1.4.9.9. Removal of surplus materials, rubbish, and similar elements.

1.4.9.10. Change of door locks to Owner's access.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01027

SECTION 01035 - MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Unit Prices" for administrative requirements governing use of unit prices.

1.2.2.2. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.

1.2.2.3. Division 1 Section "Applications for Payment" for administrative procedures governing Applications for Payment.

1.2.2.4. Division 1 Section "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.3. **MINOR CHANGES IN THE WORK:**

1.3.1. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

1.4. **CHANGE ORDER PROPOSAL REQUESTS:**

1.4.1. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1.4.1.1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

1.4.1.2. Within ten (10) days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.

1.4.1.2.1. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

1.4.1.2.2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

1.4.1.2.3. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

1.4.2. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.

1.4.2.1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.

1.4.2.2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

1.4.2.3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

1.4.2.4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.

1.4.3. Proposal Request Form: By Owner.

1.5. **CONSTRUCTION CHANGE DIRECTIVE:**

1.5.1. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1.5.1.1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.

1.5.2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1.5.2.1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.6. **CHANGE ORDER PROCEDURES:**

1.6.1. Upon the Owner's approval of a Proposal Request, the Owner will issue a Change Order for signatures of the Architect and the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01035

SECTION 01040 - COORDINATION

PART 1- GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1.2.1.1. General project coordination procedures.

1.2.1.2. Conservation.

1.2.1.3. Coordination Drawings.

1.2.1.4. Administrative and supervisory personnel.

1.2.1.5. Cleaning and protection.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Field Engineering" specifies procedures for field engineering services, including establishment of benchmarks and control points.

1.2.2.2. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and pre-installation conferences.

1.2.2.3. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.

1.2.2.4. Division 1 Section "Materials and Equipment" for coordinating general installation.

1.2.2.5. Division 1 Section "Contract Closeout" for coordinating contract closeout.

1.3. **COORDINATION:**

1.3.1. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1.3.1.1. Schedule construction operations in the 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.

1.3.1.2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.

1.3.1.3. Make provisions to accommodate items scheduled for later installation.

1.3.2. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1.3.2.1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

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

1.3.3.1. Preparation of schedules.

1.3.3.2. Installation and removal of temporary facilities.

1.3.3.3. Delivery and processing of submittals.

1.3.3.4. Progress meetings.

1.3.3.5. Project closeout activities.

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

1.3.4.1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4. **SUBMITTALS:**

1.4.1. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1.4.1.1. Show the relationship of components shown on separate Shop Drawings.

1.4.1.2. Indicate required installation sequences.

1.4.1.3. Comply with requirements contained in Section "Submittals."

1.4.2. Staff Names: Within ten (10) days of after award of contract, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities and list their addresses and telephone numbers. List of Subcontractors.

1.4.2.1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **GENERAL COORDINATION PROVISIONS:**

3.1.1. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

3.1.2. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2. **CLEANING AND PROTECTION:**

3.2.1. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

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

3.2.3. 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. Where applicable, such exposures include, but are not limited to, the following:

3.2.3.1. Excessive static or dynamic loading.

3.2.3.2. Excessive internal or external pressures.

3.2.3.3. Excessively high or low temperatures.

3.2.3.4. Thermal shock.

3.2.3.5. Excessively high or low humidity.

3.2.3.6. Air contamination or pollution.

3.2.3.7. Water or ice.

3.2.3.8. Solvents.

3.2.3.9. Chemicals.

3.2.3.10. Puncture.

3.2.3.11. Abrasion.

3.2.3.12. Heavy traffic.

3.2.3.13. Soiling, staining, and corrosion.

3.2.3.14. Rodent and insect infestation.

3.2.3.15. Combustion.

3.2.3.16. Electrical current.

3.2.3.17. Unusual wear or other misuse.

3.2.3.18. Contact between incompatible materials.

3.2.3.19. Destructive testing.

3.2.3.20. Excessive weathering.

3.2.3.21. Unprotected storage.

3.2.3.22. Improper shipping or handling.

3.2.3.23. Theft.

3.2.3.24. Vandalism.

END OF SECTION 01040

SECTION 01041 - SOIL BORING TESTS

PART 1 - GENERAL

1.1 The subsurface information has been obtained with reasonable care and is recorded in good faith. Bidders must interpret the information according to their own judgment and must not rely upon it as accurately descriptive of subsurface conditions which may be found to exist. The information is made available to bidders only that they have access to the identical information available to the Owner for assistance in preparing their proposals.

1.2 Such information shall not be considered a substitute for personal investigation, interpretations, or judgments of bidders, as to the character of subsurface materials which may be encountered for the work.

1.3 If a bidder requires additional subsurface information, he my have access to the job site for making his own explorations, at his own expense, providing, however, that he first has approval of the Owner, and also that he leaves the site in as neat and orderly condition as he finds it.

1.4 The Owner, Architect or Engineers assume no responsibility for the accuracy of such information and no representations are made by them regarding subsurface conditions.

1.5 Copy of the Soil Test Report is included with this specification section.

END OF SECTION 01041





ECS Southeast, LLP

Geotechnical Engineering Report

Jacksonville Transit

Jacksonville, Onslow County, North Carolina

ECS Project Number 22:26962R2

June 10, 2019

ECS SOUTHEAST, LLP
"Setting the Standard for Service"
Geotechnical • Construction Materials • Environmental • Facilities
NC Registered Engineering Firm F-1078
NC Registered Geologists Firm C-406
SC Registered Engineering Firm 3252

June 10, 2019

Mr. John Farabow
H.R. Associates, P.A.
2202 Wrightsville Ave.
Suite 212
Wilmington, North Carolina 28403

ECS Project No. 22:26962R2

Reference: Geotechnical Engineering Report
Jacksonville Transit
Jacksonville, Onslow County, North Carolina

Dear Mr. Farabow:

ECS Southeast (ECS) has completed the subsurface exploration and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our Proposal No. 22:22353, dated March 15, 2018. This report presents our understanding of the geotechnical aspects of the project along with, the results of the field exploration conducted, and our design and construction.

It has been our pleasure to be of service to H.R. Associates, P.A. during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify the assumptions of subsurface conditions made for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southeast, LLP

Mike Ellis, PE
Project Manager
MEllis@ecslimited.com

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NORTH CAROLINA PROFESSIONAL SEAL C23751 ENGINEER WINSLOW E. GOINS
06/10/19

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- CPT Sounding Logs S-1 through S-8
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EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the executive summary should not be utilized in lieu of reading the entire geotechnical report.

- The geotechnical exploration performed for the planned development included eight (8) electronic cone penetration test (CPT) soundings drilled to termination/refusal depths ranging from 10 to 29.4 feet.

- It is important to note that the natural geology at the site has been modified in the past. Therefore, potential fill and unsuitable materials may be present at the site.

- The soundings generally encountered Sandy SILT (ML), Silty CLAY (CL-ML) and Lean CLAY (CL) underlain by Clayey, Silty, and Clean SANDS (SC, SM, SP) underlain by Limestone. Fill soils were encountered in sounding S-5 to approximately 2 feet beneath

- The proposed building and canopy structures can be supported by conventional shallow foundations with an allowable bearing pressure of 2,000 psf.

- It is recommended that the rigid pavement system consists of 6 inches of 4,000 psi compressive concrete overlying 6 inches of ABC stone.

- A flexible pavement section may consist of at least 2 inches of surface mix asphalt overlying at least 6 inches of graded aggregate base. Similarly, a heavy duty, flexible pavement section may consist of at least 3 inches of surface mix asphalt overlying at least 8 inches of graded aggregate base.

- Based on the results of the CPT soundings and our evaluation of the site, the site is assigned a seismic class “D”.

- Two feet of undercutting should be anticipated in the area of the proposed pavement areas and three feet of undercutting should be anticipated in the area of the proposed building footprint.

1.0 INTRODUCTION

1.1 GENERAL

The purpose of this study was to provide geotechnical information for the design of the Multi Modal Transportation Center in Jacksonville, Onslow County, North Carolina. We understand the proposed construction consists of two (2) buildings with associated drive and parking areas, two (2) stormwater ponds, and a canopy structure.

The recommendations developed for this report are based on project information supplied by Mr. John Farabow of H.R. Associates, P.A. This report contains the results of our subsurface explorations, site characterization, engineering analyses, and recommendations for the design and construction of the bus station.

1.2 SCOPE OF SERVICES

To obtain the necessary geotechnical information required for design of the transportation center, eight (8) electronic cone penetration test (CPT) soundings to termination/refusal depths ranging from 10 to 29.4 feet were conducted.

This report discusses our exploratory and testing procedures, presents our findings and evaluations and includes the following.

- Project description;
- Site conditions, including geologic and special site features;
- Field exploration procedures;
- Subsurface conditions;
- Rigid and flexible pavement design recommendations;
- Site development recommendations;
- Foundation recommendations;
- Suitability of soils for re-use as fill material;
- Seismic site classification and liquefaction analysis;
- Discussion of groundwater impact (if applicable);
- Techniques to control shallow groundwater (if applicable);
- Discussion of difficult excavation (if applicable);
- Special conditions encountered (if applicable);
- Site location map; and
- Exploration location plan.

1.3 AUTHORIZATION

Our services were provided in accordance with our Proposal No. 22.22353, dated March 15, 2018, as authorized by H.R. Associates, P.A. on July 24, 2018, and includes the Terms and Conditions of Service outlined with our Proposal.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION

The project site is located near the intersection of E Thompson St and N Marine Blvd in Jacksonville, Onslow County, North Carolina. Figure 2.1.1 below shows an image of where the site is located.

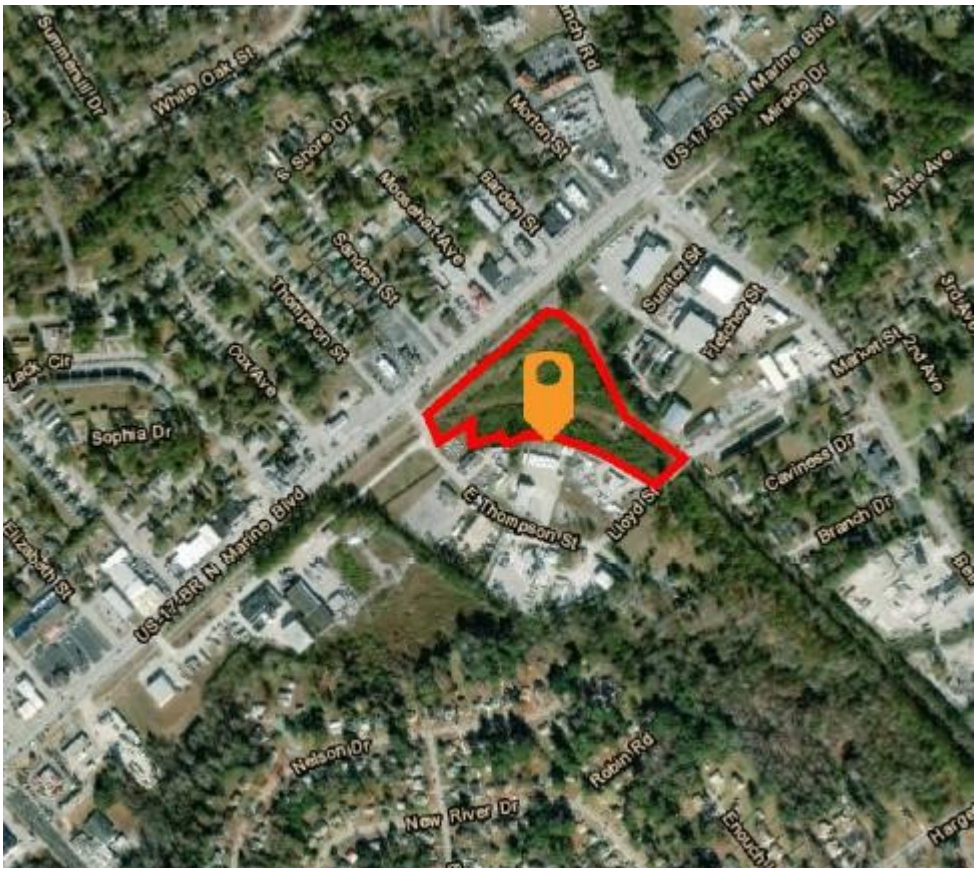


Figure 2.1.1 Site Location

2.2 CURRENT SITE CONDITIONS

The site consists of a plat that ranges from open to moderately wooded. On the south portion of the site, on old train bed runs in a west to southeast orientation. Overhead power lines run along the northwest portion of the site. A ditch runs across the center of the site. At the time of the exploration, standing water was present at select locations of the site.

2.3 PROPOSED CONSTRUCTION

We understand the that the proposed construction consists of two (2) buildings with associated drive and parking areas, two (2) stormwater ponds, and a canopy structure.

2.4 STRUCTURAL INFORMATION/LOADS

At the time of this report, structural loads and final grades for the buildings were not available. ECS has assumed that column and wall loads will likely range up to 120 kips and 5 kips per foot, respectively. Cut and fill depths are assumed to range up to 3 feet. ECS understands that the canopy structure will likely be supported by spread footings.

3.0 FIELD EXPLORATION

3.1 FIELD EXPLORATION PROGRAM

The field exploration was planned with the objective of characterizing the project site in general geotechnical and geological terms and to evaluate subsequent field data to assist in the determination of geotechnical recommendations.

3.1.1 Cone Penetrometer Soundings

The subsurface conditions were explored by drilling eight (8) electronic cone penetration test (CPT) soundings within the proposed construction area. Sounding locations were located in the field by an ECS representative using existing site features. The approximate as-drilled sounding locations are shown on the Exploration Location Diagram in Appendix A.

Electronic cone penetration tests (CPT) were conducted in the soundings in general accordance with ASTM D 5778. The cone used in the soundings has a tip area of 10 cm^2 and a sleeve area of 150 cm^2. The CPT soundings recorded tip resistance and sleeve friction measurements to assist in determining pertinent index and engineering properties of the site soils. The ratio of the sleeve friction to tip resistance is then used to aid in assessing the soil types through which the tip is advanced. Within the CPT sounding S-3, seismic tests were performed at approximately three foot intervals to refusal to measure the shear wave velocity (v_s) of the subsurface materials to aid in assessing the dynamic response properties of the site subsurface materials. The seismic shear waves are generated by making impact with a 20-pound sledgehammer onto a steel beam. The impacts are initiated on the right and left sides of the CPT rig and the corresponding wave traces recorded on an oscilloscope are analyzed to determine the shear wave velocity of the tested material. The waves are measured with three geophones that are installed in the cone. The results of the CPT soundings are presented in Appendix B.

3.1.2 Kessler Dynamic Cone Penetrometer Tests

Two (2) Kessler Dynamic Cone Penetrometer (DCP) tests were performed in the location of the proposed parking and drive areas. The Kessler DCP is used to estimate the strength characteristics of soils. The Kessler DCP was continuously driven approximately 3 feet below the existing ground surface. The Kessler DCP is driven into the soil by dropping a Dual-Mass 17.6 lb Hammer from a height of 22.6 in. The depth of cone penetration is measured at selected penetration or hammer drop intervals and the soil shear strength is reported in terms of Kessler DCP index. The Kessler DCP index is based on the average penetration depth resulting from one blow of the 17.6 lb hammer. The Kessler DCP index can be correlated to CBR and modulus of rigidity. The individual results of the Kessler DCP tests are presented in Appendix B.

3.1.3 Hand Auger Borings

A total of four (4) hand auger borings were performed across the site. Hand Augers K-1, K-2 and S-5 were advanced to four feet beneath the ground surface. Hand auger boring S-8 encountered hand auger refusal at 2.5 feet due to soil cave. The hand auger cuttings were classified with the Unified Soils Classification System (USCS). The results of the hand auger borings are presented in Appendix B

3.2 REGIONAL/SITE GEOLOGY

It is important to note that the natural geology at the site has been modified in the past. Therefore, potential fill and unsuitable materials may be present at the site. The site is located in the Coastal Plain Physiographic Province of North Carolina. The Coastal Plain is composed of seven terraces, each representing a former level of the Atlantic Ocean. Soils in this area generally consist of sedimentary materials transported from other areas by the ocean or rivers. These deposits vary in thickness from a thin veneer along the western edge of the region to more than 10,000 feet near the coast. The sedimentary deposits of the Coastal Plain rest upon consolidated rocks similar to those underlying the Piedmont and Mountain Physiographic Provinces. In general, shallow unconfined groundwater movement within the overlying soils is largely controlled by topographic gradients. Recharge occurs primarily by infiltration along higher elevations and typically discharges into streams or other surface water bodies. The elevation of the shallow water table is transient and can vary greatly with seasonal fluctuations in precipitation.

Based on the U.S. Geological Survey[1,2] the site of the proposed construction lies within the River Bend Formation (Tor). Soils in the Peedee Formation typically consist of alluvial sands, silts and clays underlain by limestone. An overview of the general site geology is illustrated in Figure 3.2.1 below.

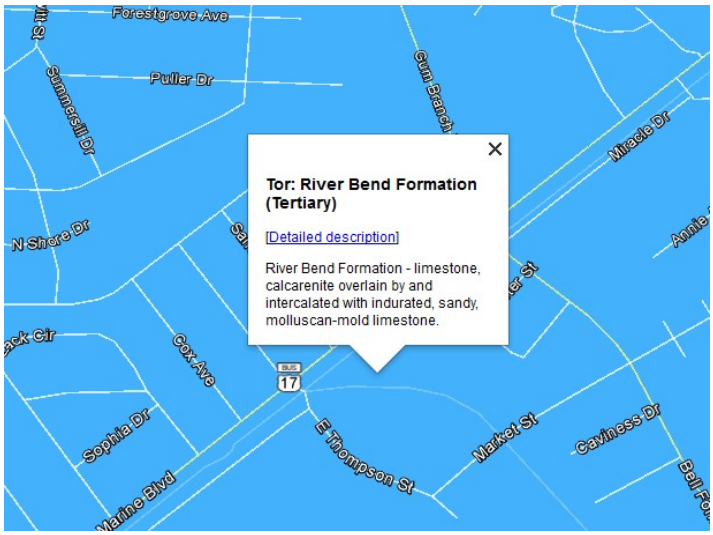


Figure 3.2.1

Geologic map for Figure 3.2.1 obtained from The North Carolina Dept. of Environment, Health, and Natural Resources, Division of Land Resources, NC Geological Survey, in cooperation with the NC Center for Geographic Information and Analysis, 1998, Geology - North Carolina (1:250,000), coverage data file geol250 and Google Earth.

[1] The North Carolina Dept. of Environment, Health, and Natural Resources, Division of Land Resources, NC Geological Survey, in cooperation with the NC Center for Geographic Information and Analysis, 1998, Geology - North Carolina (1:250,000), coverage data file geol250. The data represents the digital equivalent of the official State Geology map (1:500,000 scale), but was digitized from (1:250,000 scale) base maps.

[2] Rhodes, Thomas S., and Conrad, Stephen G., 1985, Geologic Map of North Carolina: Department of Natural Resources and Community Development, Division of Land Resources, and the NC Geological Survey, 1:500,000-scale, compiled by Brown, Philip M., et al, and Parker, John M. III, and in association with the State Geologic Map Advisory Committee.

3.3 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil encountered during our subsurface exploration. For subsurface information at a specific location, refer to the CPT Sounding Logs in Appendix B.

Table 3.3.1 Subsurface Stratigraphy

Approximate Depth Range (ft)	Stratum	Description	Ranges of N*-Values[(1)] blows per foot (bpf))
0-0.5	I	Surface Cover: Soundings and hand augers performed throughout contained an observed thickness of topsoil. Topsoil thicknesses ranged from approximately 4 to 6 inches. Deeper topsoil or organic laden soils and root balls associated with trees are most likely present in wet, poorly drained areas and potentially unexplored areas of the site.	N/A
0.5-12	II	Very Soft to Stiff, Sandy SILT (ML), SILTY CLAY (CL-ML) and Lean CLAY (CL) with interbedded Loose to Medium Dense Clayey, Silty, and Clean SAND (SC, SM, SP) and Stiff Sandy SILT (ML), Moist to Saturated. Fill soil containing gravel was encounter at S-5 to a depth of approximately 2 feet.	2-29
12-29.4	III	Loose to Very Dense, Silty and Clean SAND (SM, SP) with interbedded layers of Very Soft to Stiff, Sandy SILT (ML) and lean CLAY, Saturated	1-82
29.4	IV	LIMESTONE	100+

Notes: (1) Equivalent Corrected Standard Penetration Test Resistances

3.4 GROUNDWATER OBSERVATIONS

Porewater pressure measurements were made at the sounding locations during exploration as noted on the CPT sounding logs in Appendix B. At the hand auger borings and sounding locations, the apparent groundwater depths were observed to have ranged from 0.1 to 3.6 feet below ground surface. The groundwater levels appear to be influenced by the higher than normal amount precipitation for the Jacksonville area.

The highest groundwater observations are normally encountered in the late winter and early spring. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors not immediately apparent at the time of this exploration. If long term water levels are crucial to the development of this site, it would be prudent to verify water levels with the use of perforated pipes or piezometers.

4.0 DESIGN RECOMMENDATIONS

4.1 BUILDING DESIGN

The following sections provide recommendations for foundation design and soil supported slabs.

4.1.1 Foundations

Shallow Foundations: Provided that the subgrades and structural fills are prepared as discussed herein, the proposed buildings and canopy structures can be supported by conventional shallow foundations. The design of the foundation shall utilize the following parameters:

Table 4.1.1.1 Foundation Design

Design Parameter	Spread Footing	Strip Footing
Net Allowable Bearing Pressure[1]	2,000 psf	2,000 psf
Acceptable Bearing Soil Material	Stratum I	Stratum I
Minimum Width	30 inches	18 inches
Minimum Footing Embedment Depth (below slab or finished grade)	12 inches	12 inches
Estimated Total Settlement	1 inch	1 inch
Estimated Differential Settlement	Less than 0.5 inches	Less than 0.5 inches

1. Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.

It will be important to have the geotechnical engineer of record observe the foundation subgrade prior to placing foundation concrete; to confirm the bearing soils are what was anticipated. If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with approved structural fill up to the original design bottom of footing elevation; the original footing shall be constructed on top of the structural fill. The depth and lateral extent of the undercut should be determined in the field during undercutting operation. An ECS representative must be on site during the undercut and backfill of the areas in order to provide a report stating that the repairs were in accordance with our recommendations.

Intermediate Foundation: An aggregate pier system, is a replacement, aggregate pier, ground improvement method used to improve shallow to intermediate, soft clay, loose silt, and loose sand for support of shallow foundations. Aggregate piers improve soft soil and fill by vibration, compaction, and ramming of thin lifts of crushed rock into a drilled hole. Soft soil is removed from the ground and then very dense, high quality crushed rock is compacted into the drilled hole which expands the hole into the adjacent soil. The cavity expansion effects increase the strength and stiffness of adjacent soil. The compaction and ramming of thin lifts of crushed rock increases the strength and stiffness, increases soil bearing capacity, and reduces soil compressibility. Aggregate pier systems can improve soil conditions such that the soil can support heavier loadson conventional shallow spread and strip footings with reduced settlement.

The allowable bearing capacity will likely depend on the system selected, the foundation element configuration, and material available to the specialty contractor and should be provided as part of the design/build specialty contractors bid. ECS anticipates that a bearing capacity ranging from 3 ksf to 5 ksf can be used for the aggregate pier system depending on the selected contractor's system and should be confirmed by the specialty contractor. Specifications for the aggregate pier system for support of foundations are dependent on the specialty contractor selected and should be prepared by the selectedspecialty contractor

.

One demonstration pier should be installed with the aggregate pier system installer's standard procedures and then load-tested to determine the modulus. The load testing setup and procedures should be selected by the aggregate pier system installer and submitted for review to the project geotechnical engineers. The demonstration pier should be installed at the foundation grade level. The aggregate pier pier element installation operations should be conducted under the continuous observation of the geotechnical engineer's representative. This observation is conducted to reduce the potential for short aggregate pier element installations and excessive aggregate lift thicknesses.

4.1.2 Floor Slabs

It appears that the slabs for the structure will likely bear on the Stratum I soils – SANDS (SC, SM) and Clays (CL) or approved structural fill.

Subgrade Modulus: Provided the "Subgrade Preparations" and "Earthwork Operations" Sections of this report are followed, the slab may be designed assuming a modulus of subgrade reaction, k of 125 pci (lbs/cu. inch). The modulus of subgrade reaction value is based on a 1 ft by 1 ft plate load test basis.

Slab Isolation: Ground-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free-floating slab, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab. Maximum differential settlement of soils supporting interior slabs is anticipated to be less than 0.5 inches in 50 feet.

4.1.3 Seismic Design Considerations

Seismic Site Classification: The International Building Code (IBC) 2009 requires site classification for seismic design based on the upper 100 feet of a soil profile. Three methods are utilized in classifying sites, namely the shear wave velocity (v_s) method; the unconfined compressive strength (s_u) method; and the Standard Penetration Resistance (N-value) method. The first method (shear wave velocity) was used in classifying this site.

The results of the shear wave velocity profiles are contained in Appendix C. The seismic site class definitions for the weighted average of shear wave velocity or SPT N-value in the upper 100 feet of the soil profile are shown in the following table:

Table 4.1.3.1: Seismic Site Classification

Site Class	Soil Profile Name	Shear Wave Velocity, Vs, (ft./s)	N value (bpf)
A	Hard Rock	Vs > 5,000 fps	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	>50
D	Stiff Soil Profile	600 ≤ Vs ≤ 1,200 fps	15 to 60
E	Soft Soil Profile	Vs < 600 fps	<15

The North Carolina Building Code (2009 International Building Code with North Carolina Amendments) requires that a seismic Site Class be assigned for new structures. The seismic Site Class for the site was determined by calculating a weighted average of the shear velocities of the overburden to the depth of rock/refusal. The CPT test data indicates that the existing natural, overburden soils at the site have shear velocities ranging from approximately 270 ft/sec to 1,243 ft/sec. The method for determining the weighted average value is presented in Section 1613.5.5 of the IBC 2009. The weighted average value for the site is 874 ft/sec. Based on the results of the CPT soundings and our evaluation of the site, the site is assigned a seismic class "D".

Liquefaction: The potential for liquefaction at the site is considered low based upon the CPT results and the liquefaction index procedure developed by Iwasaki (1982). Based on our CPT results and our evaluation using a site peak ground acceleration of 0.08, an earthquake event with a magnitude of 7.3 and procedures developed by Robertson (2009) and Boulanger & Idriss (2014), the liquefaction induced settlement at the subject site is estimated to be less than approximately ½ inch.

Ground Motion Parameters: In addition to the seismic site classification noted above, ECS has determined the design spectral response acceleration parameters following the IBC 2009 methodology.

The mapped responses were estimated from the free Java Ground Motion Parameter Calculator available from the USGS website (http://earthquake.usgs.gov/designmaps/us/application.php). The design responses for the short (0.2 sec, S_{DS}) and 1-second period (S_{D1}) are noted in bold at the far right end of the following table.

Table 4.1.3.2: Ground Motion Parameters (IBC 2009 Method)

Period (sec)	Mapped Spectral Response Accelerations (g)		Values of Site Coefficient for Site Class		Maximum Spectral Response Acceleration Adjusted for Site Class (g)		Design Spectral Response Acceleration (g)	
Reference	Figures 1613.5 (1) & (2)		Tables 1613.5.3 (1) & (2)		Eqs. 16-37 & 16-38		Eqs. 16-39 & 16-40	
0.2	S_S	0.199	F_a	1.600	$S_{MS}=F_aS_s$	0.318	$S_{DS}=2/3\ S_{MS}$	0.212
1.0	S_1	0.075	F_v	2.400	$S_{M1}=F_vS_1$	0.180	$S_{D1}=2/3\ S_{M1}$	0.120

The Site Class definition should not be confused with the Seismic Design Category designation, which the structural engineer typically assesses. If a higher site classification is beneficial to the project, ECS would be pleased to discuss additional testing capabilities in this regard.

4.2 SITE DESIGN CONSIDERATIONS

4.2.1 Pavement Sections

Subgrade Characteristics: Based on the results of our soil test soundings, it appears that the soils that will likely be exposed as pavement subgrades will likely consist mainly of CLAY (CL) and SAND (SM). Based on the Kessler DCP results and soil types, a CBR value of 8 has been selected to model the subgrade soils. The pavement design assumes subgrades consist of suitable materials evaluated by ECS and placed and compacted to at least 98 percent of the maximum dry density as determined by the Standard Proctor test (ASTM D 698) in accordance with the project specifications. Undercutting should be anticipated in the upper two feet of the proposed pavement areas.

Flexible Pavements: Anticipated traffic conditions were not provided to ECS. However, based on our experience for light duty traffic for similar projects, a flexible pavement section may consist of at least 2 inches of surface mix asphalt overlying at least 6 inches of graded aggregate base. Similarly, a heavy duty, flexible pavement section may consist of at least 3 inches of surface mix asphalt overlying at least 8 inches of graded aggregate base.

Rigid Concrete Pavements: For heavy-duty traffic areas, the Portland cement concrete pavement section should consist of air-entrained Portland cement concrete having a minimum 28-day compressive strength of 4,000 psi. The rigid pavement section should be provided with construction joints at appropriate intervals per PCA requirements. The construction joints should be reinforced with dowels to transfer loads across the joints.

Anticipated traffic conditions were not provided to ECS. However, based on our experience for heavy duty traffic for similar projects, it is recommended a rigid pavement section consists of 6 inches of 4,000 psi compressive strength concrete overlying 6 inches of ABC stone.

Design Considerations: For the design and construction of exterior pavements, the subgrades should be prepared in strict accordance with the recommendations in the “Subgrade Preparation” and “Engineered Fill Placement” sections of this report. An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrade and other problems related to the deterioration of the pavement can be expected. Furthermore, good drainage should minimize the possibility of the subgrade materials becoming saturated during the normal service period of the pavement.

The graded aggregate based course materials beneath pavements should be compacted to at least 98 percent of their Modified Proctor maximum dry density (ASTM D 1557).

Regardless of the section and type of construction utilized, saturation of the subgrade materials and asphalt pavement areas results in a softening of the subgrade material and shortened life span for the pavement. Therefore, we recommend that both the surface and subsurface materials for the pavement be properly graded to enhance surface and subgrade drainage. By quickly removing surface and subsurface water, softening of the subgrade can be reduced and the performance of the parking area can be improved. Site preparation for the parking areas should be similar to that for the building area including stripping, proofrolling, and the placement of compacted structural fill.

Please note that large, front-loading trash dumpsters frequently impose concentrated front-wheel loads on pavements during loading. This type of loading typically results in rutting of bituminous pavements and ultimately pavement failures and costly repairs. Consequently, we recommend the use of an 8 inch thick, mesh reinforced concrete slab that extends the entire length of the truck. Concrete pavements should be properly jointed and reinforced as needed to help reduce the potential for cracking and to permit proper load transfer.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping vegetation, rootmat, topsoil, existing fill, and any other soft or unsuitable materials from the 10-foot expanded canopy area and 5-foot expanded pavement limits. ECS should be called to verify that topsoil and unsuitable surficial materials have been completely removed prior to the placement of structural fill or construction of the building and parking lot.

5.1.2 Proofrolling

It is important to note that the natural geology at the site has been modified in the past. Therefore, potential fill and unsuitable materials may be present at the site.

After removing unsuitable surface materials, cutting to the proposed grade, and prior to the placement of any structural fill or other construction materials, the exposed subgrade should be examined by the geotechnical engineer or authorized representative. The exposed subgrade should be thoroughly proofrolled with previously approved construction equipment having a minimum axle load of 10 tons (e.g. fully loaded tandem-axle dump truck). The areas subject to proofrolling should be traversed by the equipment in two perpendicular (orthogonal) directions with overlapping passes of the vehicle under the observation of the geotechnical engineer or authorized representative. This procedure is intended to assist in identifying any localized yielding materials. In the event that unstable or "pumping" subgrade is identified by the proofrolling, those areas should be marked for repair prior to the placement of any subsequent structural fill or other construction materials. Methods of repair of unstable subgrade, such as undercutting or moisture conditioning, should be discussed with the geotechnical engineer to determine the appropriate procedure with regard to the existing conditions causing the instability. Test pits may be excavated to explore the shallow subsurface materials in the area of the instability to help in determined the cause of the observed unstable materials and to assist in the evaluation of the appropriate remedial action to stabilize the subgrade. Two feet of undercutting should be anticipated in the area of the proposed pavement areas and three feet of undercutting should be anticipated in the area of the proposed building footprint.

5.1.3 Subgrade Stabilization

Subgrade Compaction: Upon completion of subgrade documentation, the exposed subgrade within the 10-foot expanded building/canopy areas and 5-foot expanded pavement limits should be moisture conditioned to within -3 and +3 % of the soil's optimum moisture content and be compacted with suitable equipment (minimum 10-ton roller) to a depth of 10 inches. Subgrade compaction within the expanded building, pavement, and embankment limits should be to a dry density of at least 98% of the Standard Proctor maximum dry density (ASTM D698). Beyond these areas, compaction of at least 95% should be achieved. ECS should be called to document that proper subgrade compaction has been achieved.

Subgrade Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits for the canopy structure, pavements, etc. Field density testing of subgrades should be performed at frequencies in Table 5.1.3.1.

Table 5.1.3.1 Frequency of Subgrade Compaction Testing

Location	Frequency of Tests
Building/Canopy Areas	1 test per 2,500 sq. ft.
Pavement Areas	1 test per 5,000 sq. ft.

5.2 EARTHWORK OPERATIONS

5.2.1 Structural Fill Materials

Product Submittals: Prior to placement of structural fill, representative bulk samples (about 50 pounds) of on-site and off-site borrow should be submitted to ECS for laboratory testing, which will include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Satisfactory Structural Fill Materials: Materials satisfactory for use as structural fill should consist of inorganic soils classified as SM, SC, SW, SP, GW, GP, GM, and GC, or a combination of these group symbols, per ASTM D 2487. Natural fine-grained soils classified as clays or silts (CL, ML) should generally not be considered for use as engineered fill, but may be evaluated by the geotechnical engineer to determine their suitability at the contractor's request. The materials should be free of organic matter, debris, and should contain no particle sizes greater than 4 inches in the largest dimension. Open graded materials, such as gravels (GP), which contain void space in their mass should not be used in structural fills unless properly encapsulated with filter fabric. Suitable structural fill material should have the index properties shown in Table 6.2.

Table 5.2.1.1 Structural Fill Index Properties

Location	Liquid Limit	Plasiticity Index	Max % Fines Passing # 200 Sieve
Canopy Areas	35 max	9 max	20
Pavement Areas	35 max	9 max	20

Unsatisfactory Materials: Materials that should not be used as engineered fill include topsoil, organic materials (OH, OL), and high plasticity clays and silts (CH, MH). Such materials removed during grading operations should be either stockpiled for later use in landscape fills, or placed in approved on or off-site disposal areas.

On-Site Borrow Suitability: Silty and clean sands (SM, SP) with a fines content less than 20 percent should be suitable for re-use as structural fill. Moisture conditioning should be anticipated for the soils to achieve the optimum moisture content for fill placement.

5.2.2 Compaction

Structural Fill Compaction: Structural fill within the expanded building, pavement, and embankment limits should be placed in maximum 8-inch loose lifts, moisture conditioned as necessary to within -3 and +3 % of the soil's optimum moisture content, and be compacted with suitable equipment to a dry density of at least 98% of the Standard Proctor maximum dry density (ASTM D698). Beyond these areas, compaction of at least 95% should be achieved. ECS should be called on to document that proper fill compaction has been achieved.

Fill Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits of the fill zones for the canopy and pavement areas, at the time of fill placement. Grade controls should be maintained throughout the filling operations. Filling operations should be observed on a full-time basis by a qualified representative of the construction testing laboratory to determine that the minimum compaction requirements are being achieved. Field density testing of fills should be performed at the frequencies shown in Table 5.2.2.1, but not less than 1 test per lift.

Table 5.2.2.1 Frequency of Compaction Tests in Fill Areas

Location	Frequency of Tests
Canopy Limits	1 test per 2,500 sq. ft. per lift
Pavement Areas	1 test per 5,000 sq. ft. per lift

Compaction Equipment: Compaction equipment suitable to the soil type being compacted should be used to compact the subgrades and fill materials. Sheepsfoot compaction equipment should be suitable for the fine-grained soils (Clays and Silts). A vibratory steel drum roller should be used for compaction of coarse-grained soils (Sands) as well as for sealing compacted surfaces.

Fill Placement Considerations: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and frozen or frost-heaved soils should be removed prior to placement of structural fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

At the end of each work day, fill areas should be graded to facilitate drainage of any precipitation and the surface should be sealed by use of a smooth-drum roller to limit infiltration of surface water.

Drying and compaction of wet soils is typically difficult during the cold, winter months. Accordingly, earthwork should be performed during the warmer, drier times of the year, if practical. Proper drainage should be maintained during the earthwork phases of construction to prevent ponding of water which has a tendency to degrade subgrade soils.

We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. We do not anticipate significant problems in controlling moisture within the fill during dry weather, but moisture control may be difficult during winter months or extended periods of rain. The control of moisture content of higher plasticity soils is difficult when these soils become wet. Further, such soils are easily degraded by construction traffic when the moisture content is elevated.

5.3 FOUNDATION OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 2 to 3-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Foundation Subgrade Observations: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. The preparation of subgrades, for the pavement and canopy areas, should be observed on a full-time basis by ECS personnel. These observations should be performed by an experienced geotechnical engineer or qualified person to confirm that unsuitable materials have been removed and that the prepared subgrade meets project requirements for support of the proposed construction and/or fills.

It will be important to have the geotechnical engineer of record observe the foundation subgrade prior to placing foundation concrete; to confirm the bearing soils are what was anticipated. If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with approved structural fill up to the original design bottom of footing elevation; the original footing shall be constructed on top of the structural fill. The depth and lateral extent of the undercut should be determined in the field during undercutting operation. An ECS representative must be on site during the undercut and backfill of the areas in order to provide a report stating that the repairs were in accordance with our recommendations.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be suitable for support of utility pipes. The pipe subgrade should be observed and probed for stability by ECS to evaluate the suitability of the materials encountered. Any loose or unsuitable materials encountered at the utility pipe subgrade elevation should be removed and replaced with suitable compacted structural fill or pipe bedding material.

Utility Backfilling: The granular bedding material should be at least 4 inches thick, but not less than that specified by the project drawings and specifications. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for structural fill given in this report. Compacted backfill should be free of topsoil, roots, ice, or any other material designated by ECS as unsuitable. The backfill should be moisture conditioned, placed, and compacted in accordance with the recommendations of this report.

Excavation Safety: Excavations and slopes should be made and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing and constructing stable, temporary excavations and slopes and should shore, slope, or bench the sides of the excavations and slopes as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

5.5 GENERAL CONSTRUCTION CONSIDERATIONS

Moisture Conditioning: During the cooler and wetter periods of the year, delays and additional costs should be anticipated. At these times, reduction of soil moisture may need to be accomplished by a combination of mechanical manipulation in order to lower moisture contents to levels appropriate for compaction. Alternatively, during the drier times of the year, such as the summer months, moisture may need to be added to the soil to provide adequate moisture for successful compaction according to the project requirements.

Subgrade Protection: Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development areas, including structural and pavement areas. It would be advisable to designate a haul road and construction staging area to limit the areas of disturbance and to prevent construction traffic from excessively degrading sensitive subgrade soils and existing pavement areas. Haul roads and construction staging areas could be covered with excess depths of aggregate to protect those subgrades. The aggregate can later be removed and used in pavement areas.

Surface Drainage: Surface drainage conditions should be properly maintained. Surface water should be directed away from the construction area, and the work area should be sloped away from the construction area at a gradient of 1 percent or greater to reduce the potential of ponding water and the subsequent saturation of the surface soils. At the end of each work day, the subgrade soils should be sealed by rolling the surface with a smooth drum roller to minimize infiltration of surface water.

Excavation Safety: Cuts or excavations associated with utility excavations may require forming or bracing, slope flattening, or other physical measures to control sloughing and/or prevent slope failures. Contractors should comply applicable OSHA regulations to confirm that adequate protection of the excavations and trench walls is provided.

Excavation Considerations: Based on the results of the soundings, we expect that the natural Coastal Plain soils encountered on this site can be excavated with conventional earth moving equipment such as loaders, bulldozers, rubber tired backhoes, etc.

The site soils are OSHA Type C soils for the purpose of temporary excavation support. Excavations should be constructed in compliance with current OSHA regulations for excavation and trenching safety. Excavations should be observed by a "competent person," as defined by OSHA, who should evaluate the specific soil type and other conditions, which may control the excavation side slopes or the need for shoring or bracing. Regardless, site safety shall be the sole responsibility of the contractor and their subcontractors. Exposed earth slopes shall be protected during periods of inclement weather.

Erosion Control: The surface soils may be erodible. Therefore, the contractor should provide and maintain good site drainage during earthwork operations to maintain the integrity of the surface soils. Erosion and sedimentation controls should be in accordance with sound engineering practices and local requirements.

6.0 CLOSING

ECS has prepared this report of findings, evaluations, and recommendations to guide geotechnical-related design and construction aspects of the project.

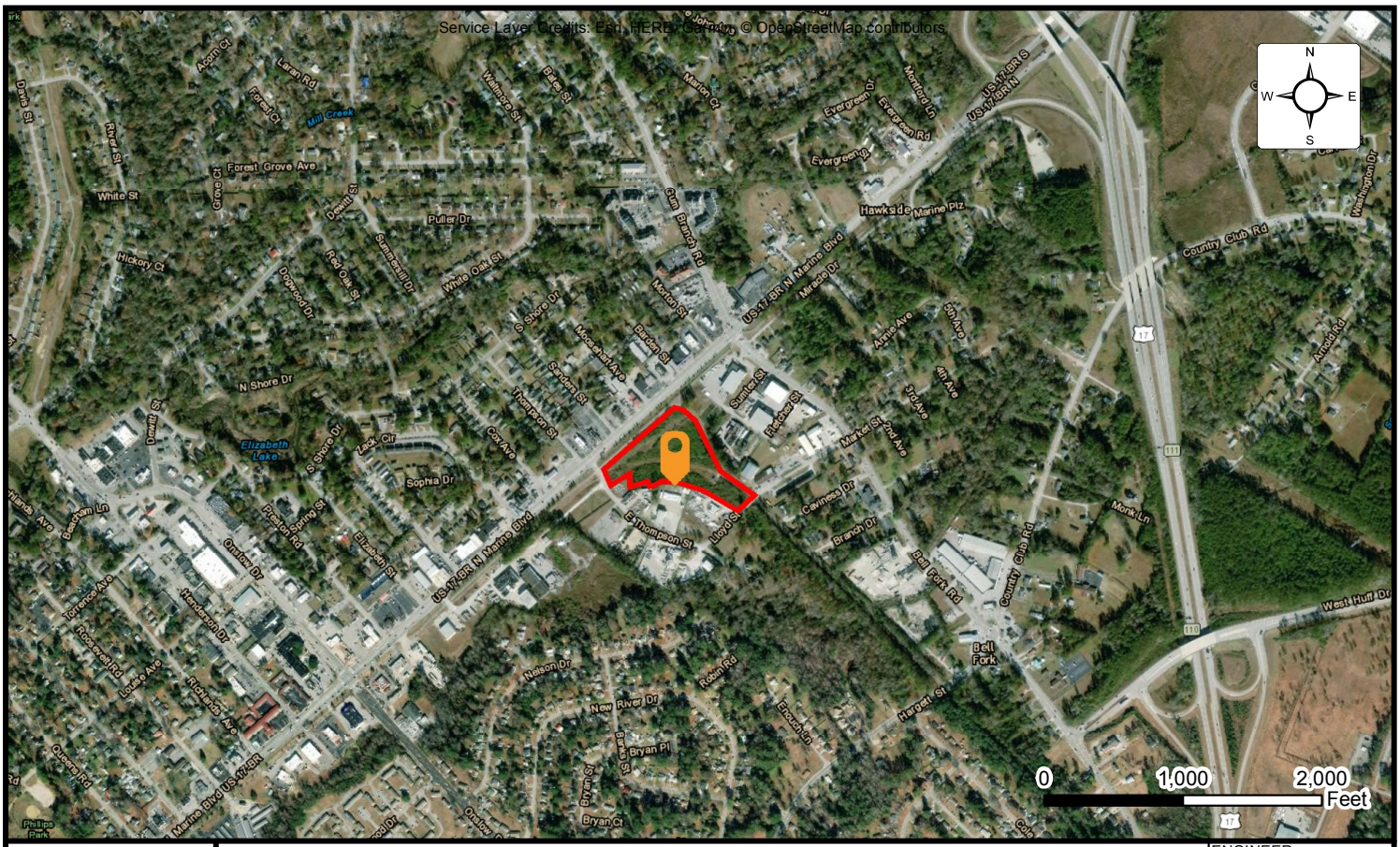
The description of the proposed project is based on information provided to ECS by H.R. Associates, P.A. If any of this information is inaccurate, either due to our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted immediately so that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed construction.

We recommend that ECS be allowed to review the project's plans and specifications pertaining to our work so that we may ascertain consistency of those plans/specifications with the intent of the geotechnical report.

Field observations, monitoring, and quality assurance testing during earthwork and foundation installation are an extension of and integral to the geotechnical design recommendation. We recommend that the owner retain these quality assurance services and that ECS be allowed to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Drawings & Reports

Site Location Diagram
Exploration Location Diagram



SITE LOCATION DIAGRAM
JACKSONVILLE TRANSIT

JACKSONVILLE, NC

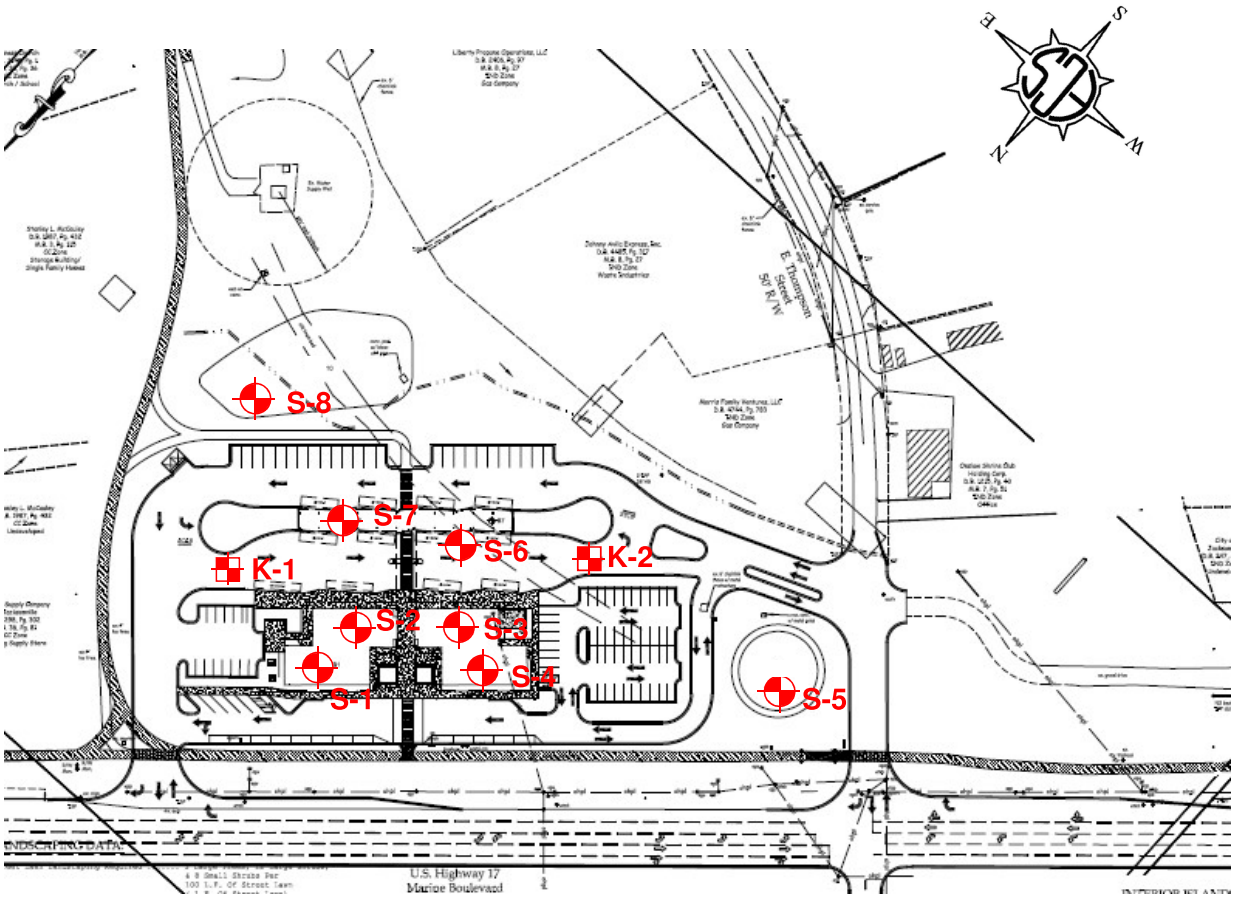
ENGINEER	WEG
SCALE	1 " = 1000 '
PROJECT NO.	26962
SHEET	1 OF 2
DATE	8/15/2018

EXPLORATION LOCATION DIAGRAM

Jacksonville Transit

Jacksonville, North Carolina

REFERENCE	Parker & Associates
	Sheet: 1 of 10
ENGINEER	WEG
DRAFTING	MME
SCALE	NTS
PROJECT NO..	22:26962
SHEET	2 of 2
DATE	8/15/2018



DENOTES APPROXIMATE LOCATION OF CPT SOUNDING

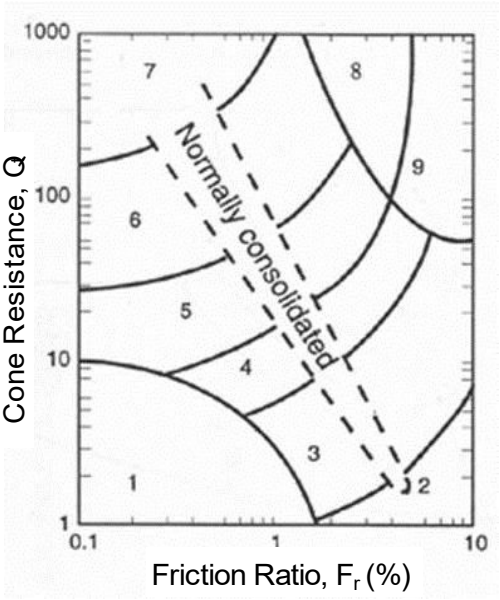
DENOTES APPROXIMATE LOCATION OF HAND AUGER BORING WITH KESSLER DCP TESTS

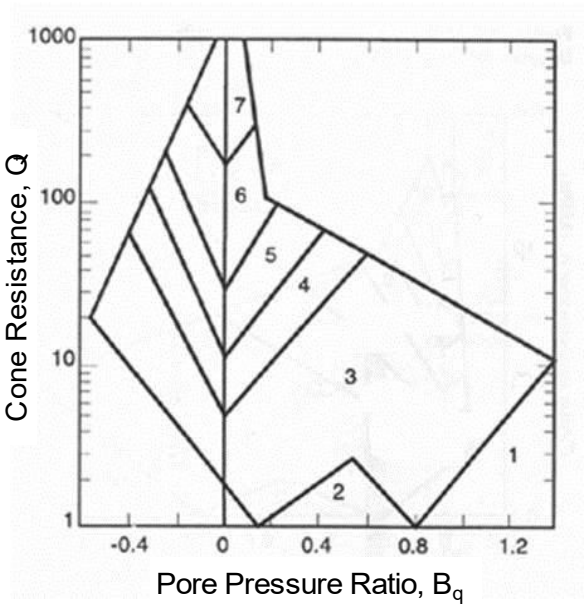
APPENDIX B – Field Operations

Reference Notes for Sounding Logs
CPT Sounding Logs S-1 through S-8
Kessler DCP Results
Reference Notes for USCS
Hand Auger Logs

REFERENCE NOTES FOR CONE PENETRATION TEST (CPT) SOUNDINGS

In the CPT sounding procedure (ASTM-D-5778), an electronically instrumented cone penetrometer is hydraulically advanced through soil to measure point resistance (q_c), pore water pressure (u_2), and sleeve friction (f_s). These values are recorded continuously as the cone is pushed to the desired depth. CPT data is corrected for depth and used to estimate soil classifications and intrinsic soil parameters such as angle of internal friction, preconsolidation pressure, and undrained shear strength. The graphs below represent one of the accepted methods of CPT soil behavior classification (Robertson, 1990).





1. Sensitive, Fine Grained
2. Organic Soils-Peats
3. Clays; Clay to Silty Clay
4. Clayey Silt to Silty Clay
5. Silty Sand to Sandy Silt
6. Clean Sands to Silty Sands
7. Gravelly Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff Fine Grained

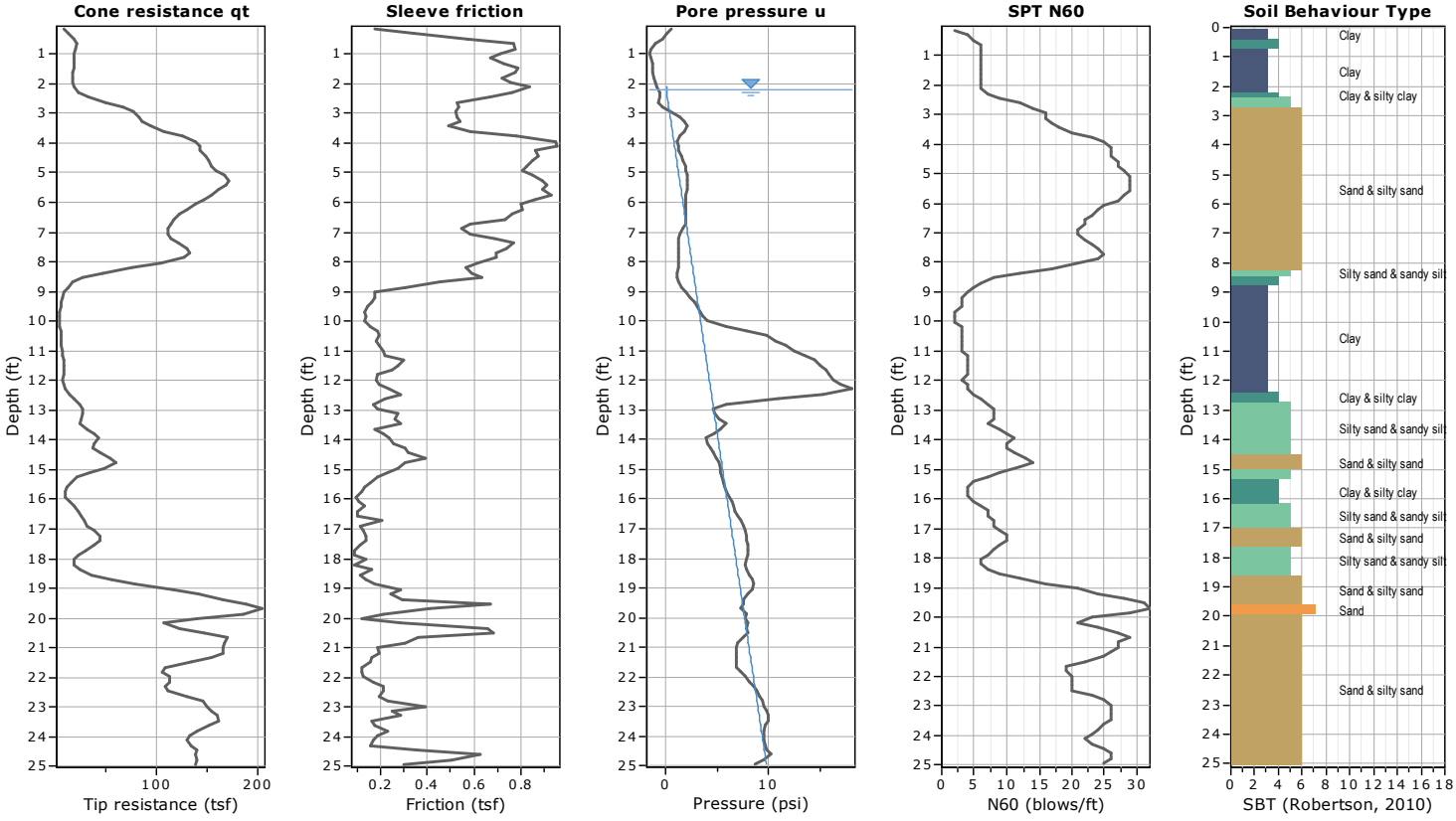
The following table presents a correlation of corrected cone tip resistance (q_c) to soil consistency or relative density:

SAND		SILT/CLAY	
Corrected Cone Tip Resistance (q_c) (tsf)	**Relative Density**	**Corrected Cone Tip Resistance (q_c) (tsf)**	**Relative Density**
<20	Very Loose	<5	Very Soft
20-40	Loose	5-10	Soft
40-120	Medium Dense	10-15	Firm
		15-30	Stiff
120-200	Dense	30-45	Very Stiff
>200	Very Dense	45-60	Hard
		>60	Very Hard

ECS Southeast, LLP
6714 Netherlands Drive
Wilmington, North Carolina 28405
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

CPT: S-1
Total depth: 24.93 ft



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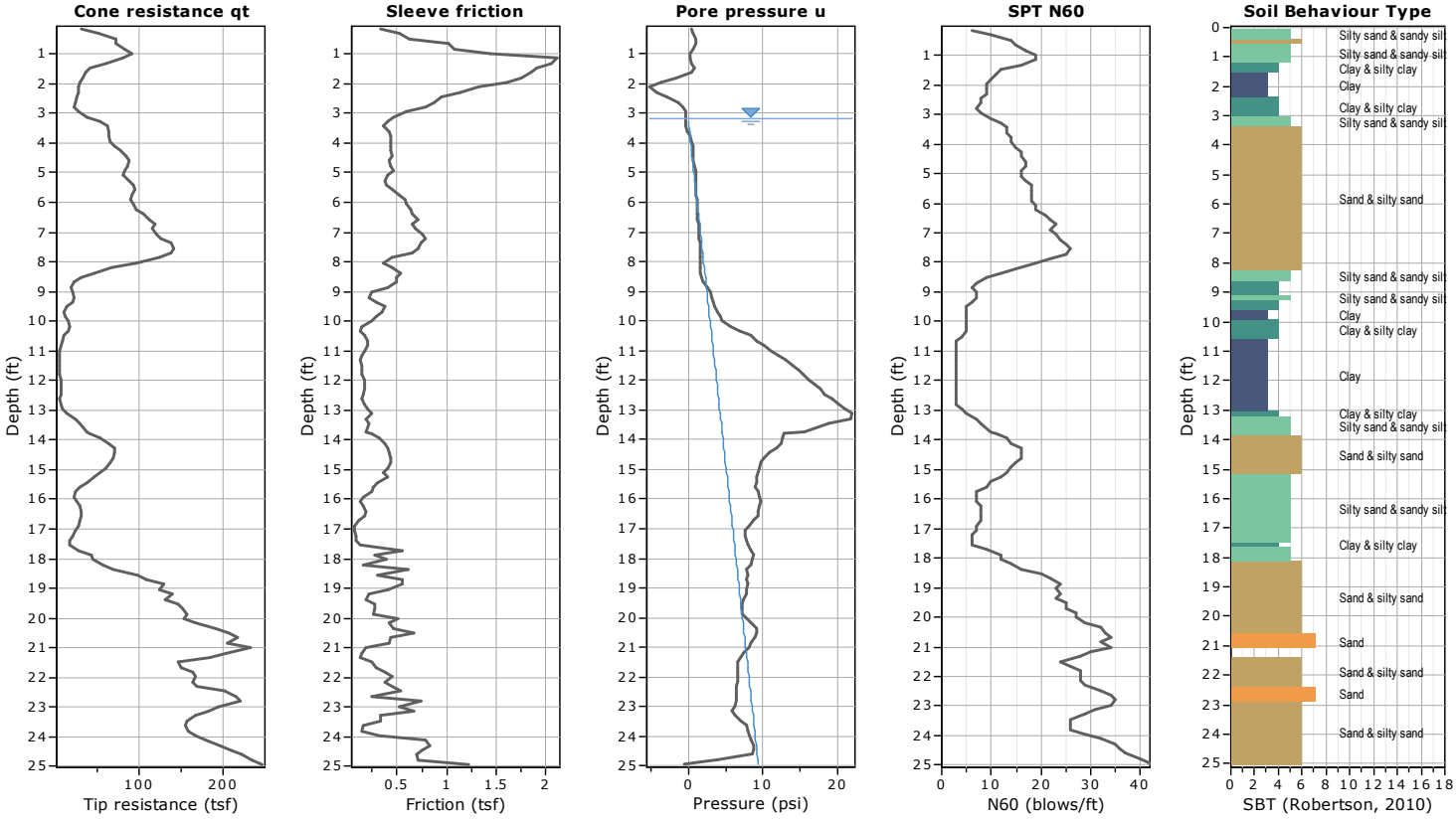
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

CPT: S-2
Total depth: 24.93 ft



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6714 Netherlands Drive
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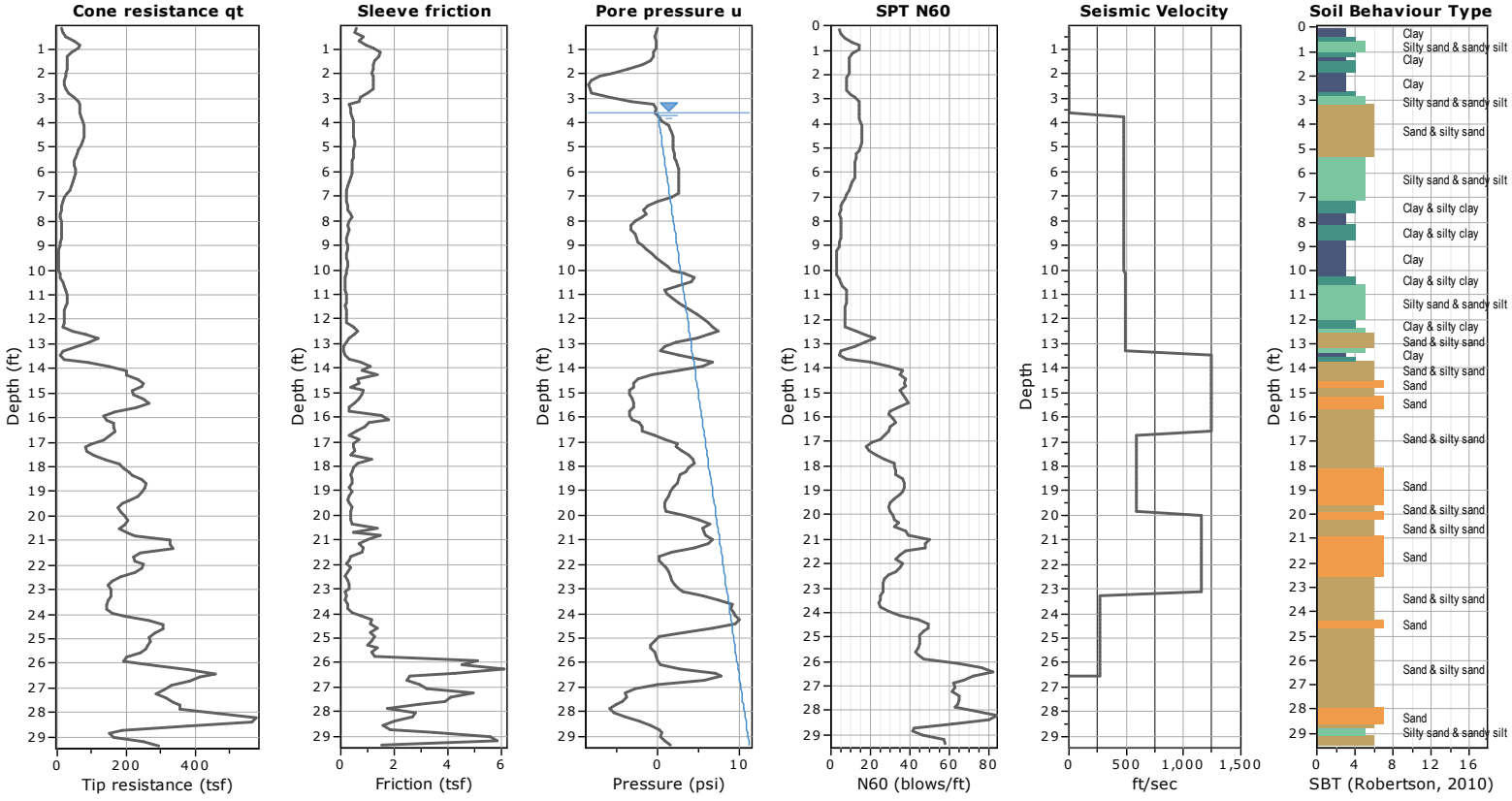
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

CPT: S-3
Total depth: 29.36 ft

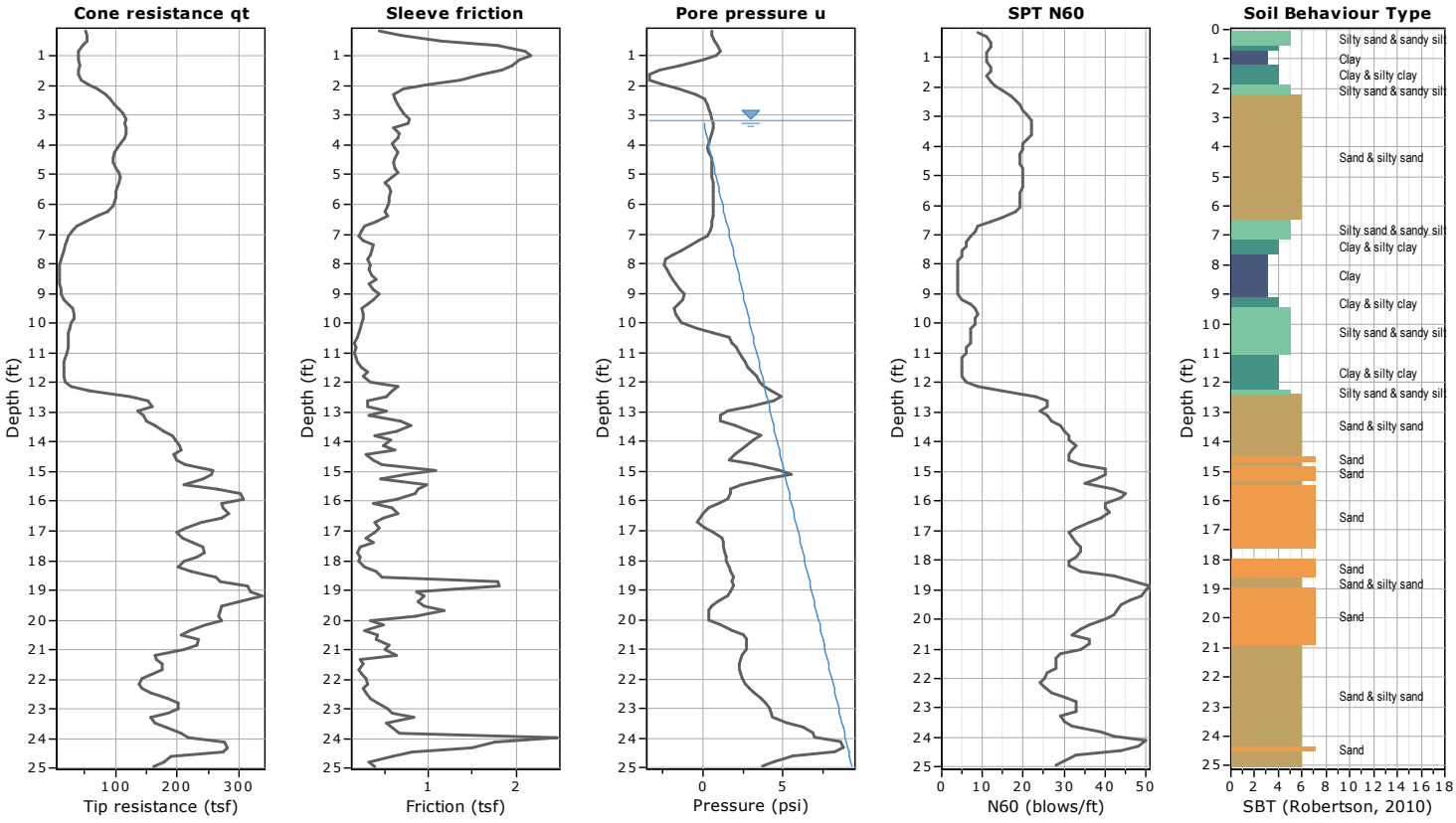


CPeT-IT v.2.0.1.16 - CPTU data presentation & interpretation software - Report created on: 8/14/2018, 12:17:07 PM
Project file:

ECS Southeast, LLP
6714 Netherlands Drive
Wilmington, North Carolina 28405
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

CPT: S-4
Total depth: 24.93 ft



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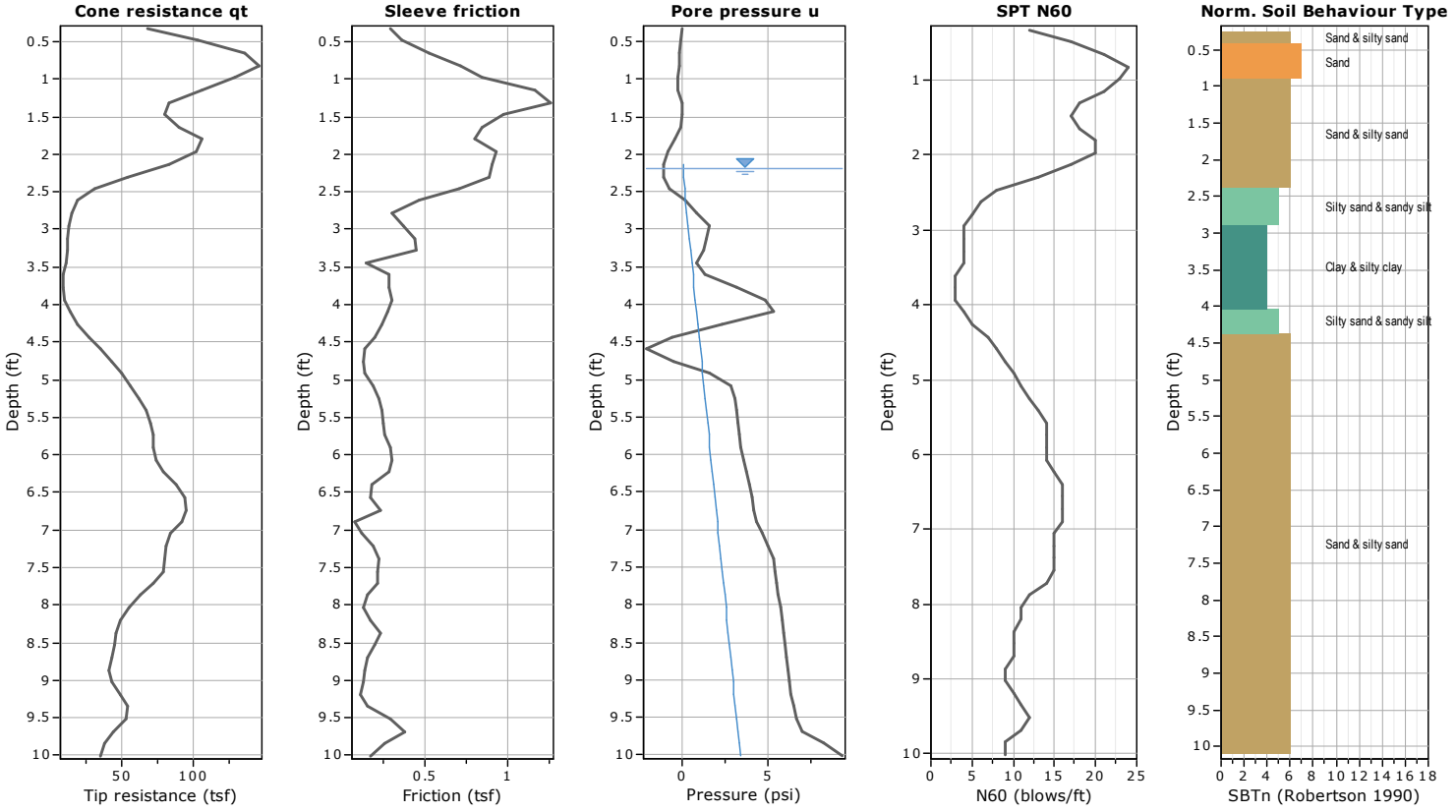
Wilmington, North Carolina 28405
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

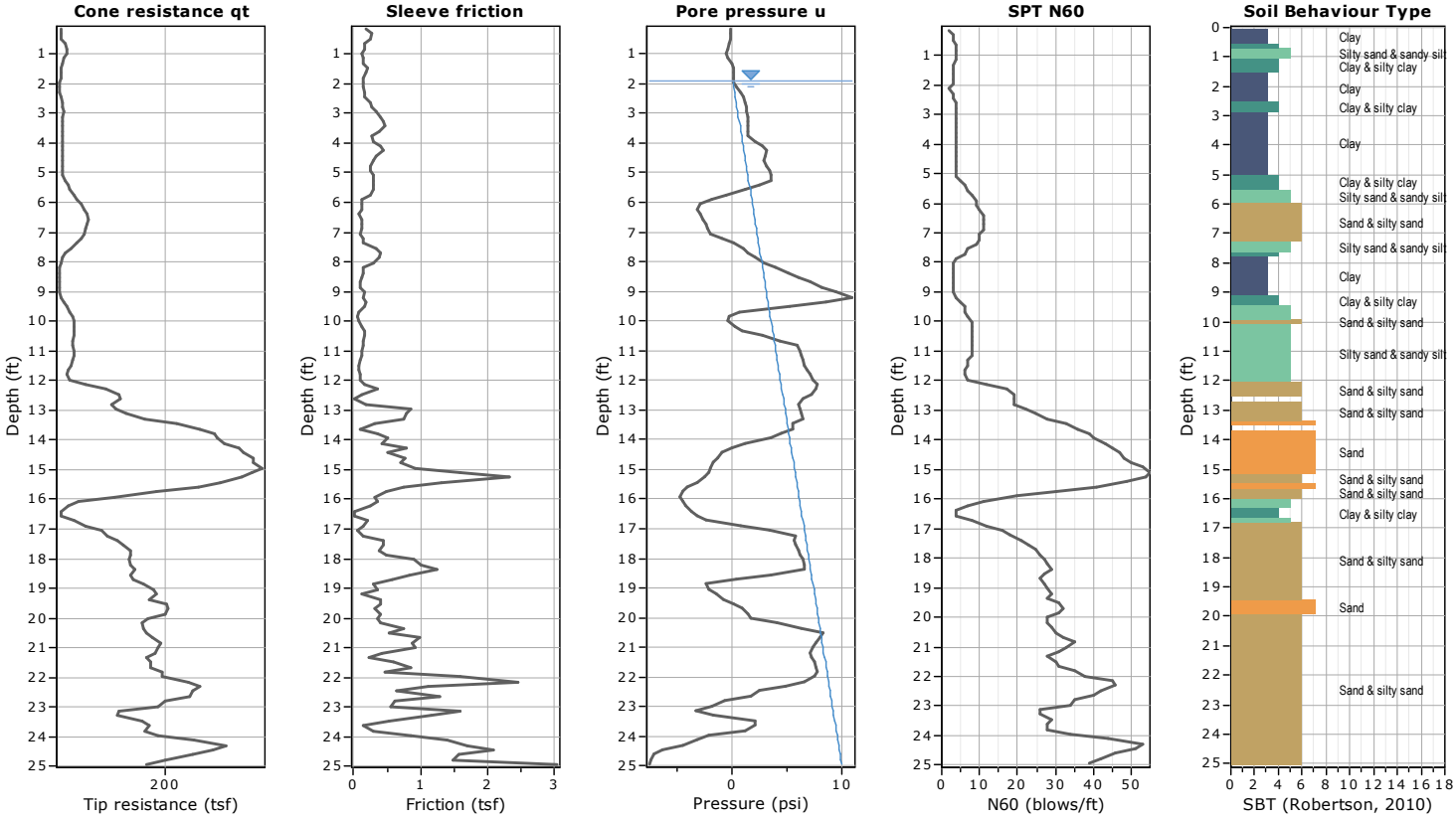
CPT: S-5
Total depth: 10.01 ft



ECS Southeast, LLP
6714 Netherlands Drive
Wilmington, North Carolina 28405
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

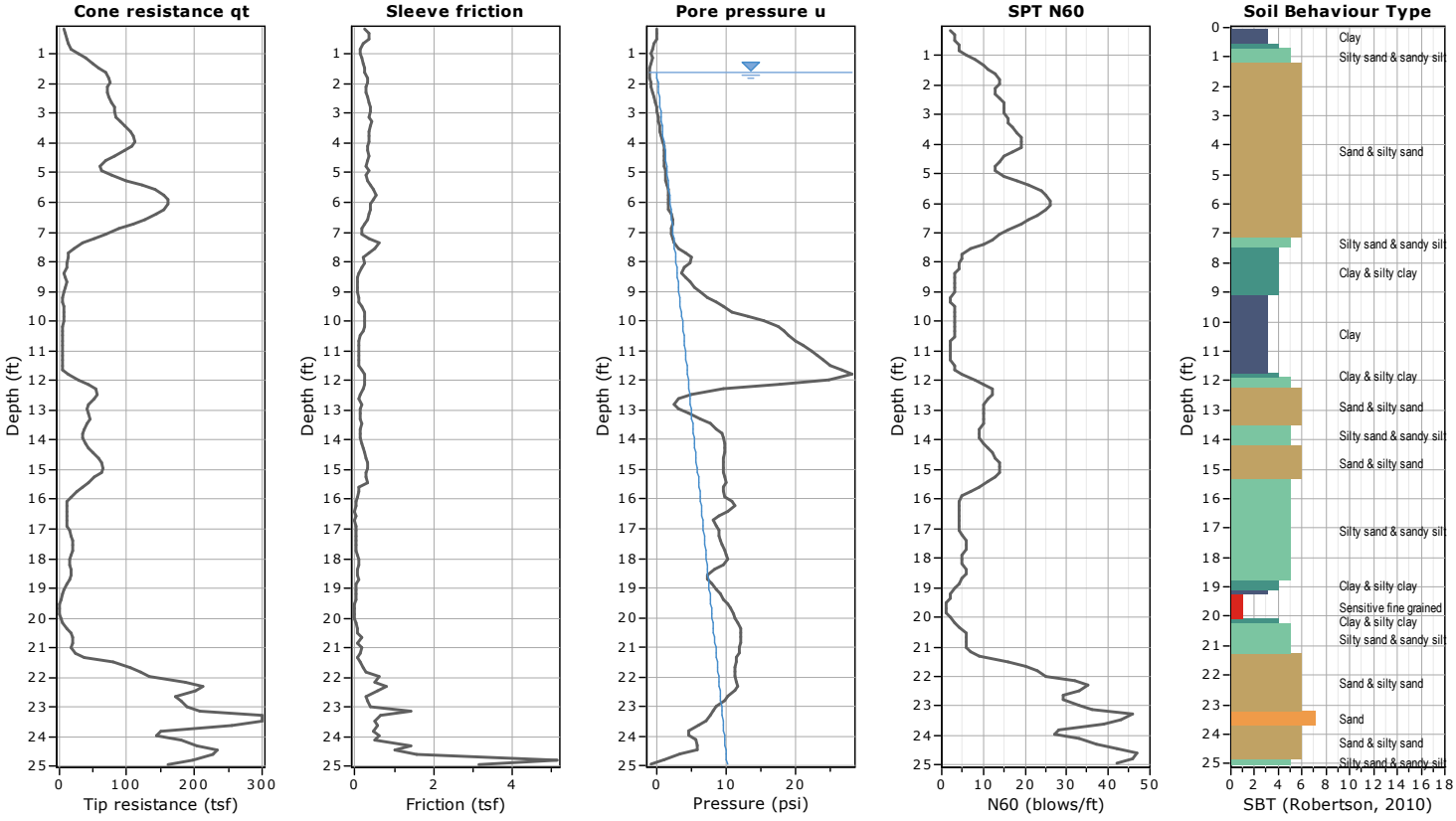
CPT: S-6
Total depth: 24.93 ft



ECS Southeast, LLP
6714 Netherlands Drive
Wilmington, North Carolina 28405
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

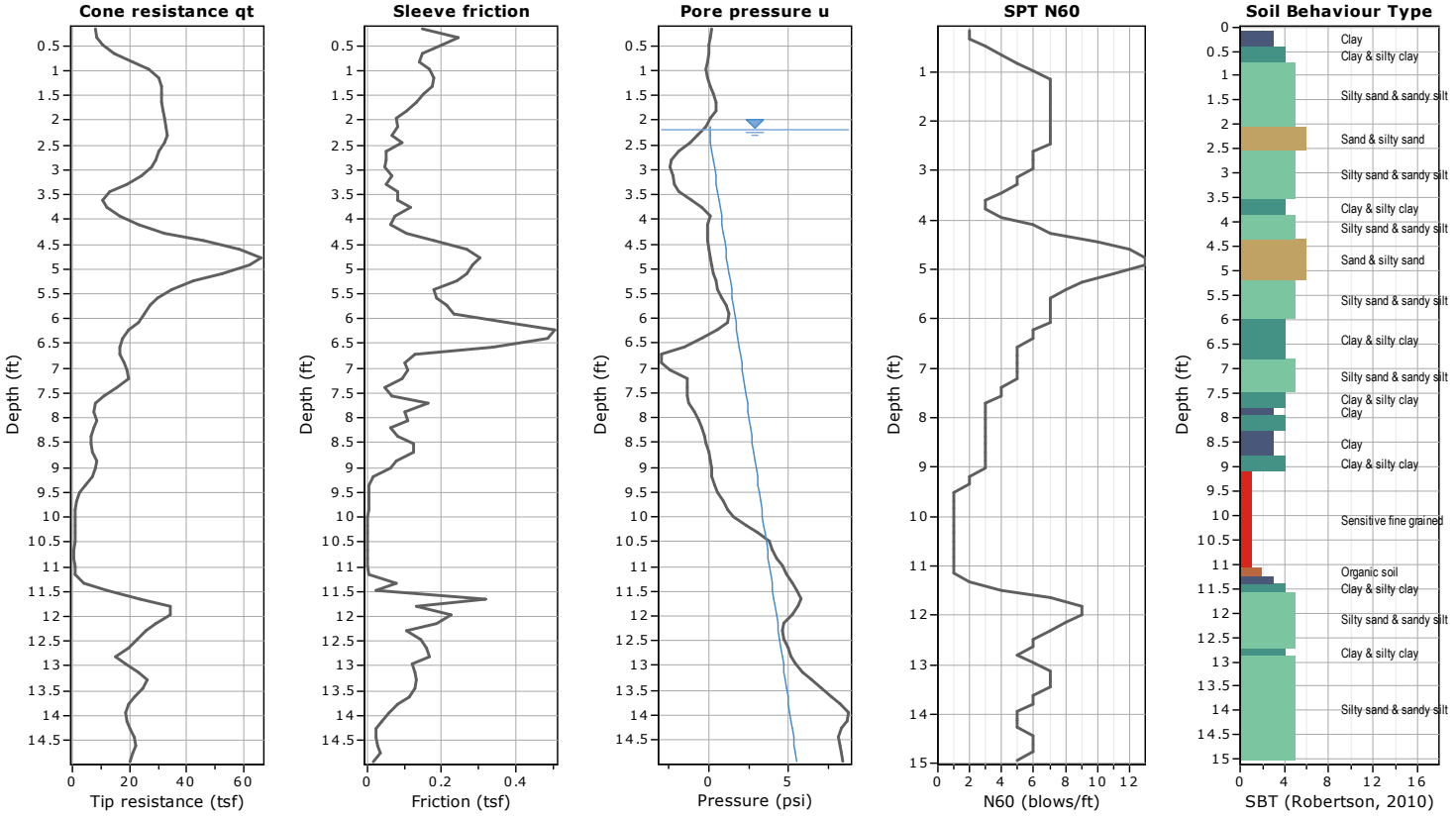
CPT: S-7
Total depth: 24.93 ft



ECS Southeast, LLP
6714 Netherlands Drive
Wilmington, North Carolina 28405
ECS Project Number 22:26962

Project: **Jacksonville Transit**
Location: **Jacksonville, Onslow County, North Carolina**

CPT: S-8
Total depth: 14.93 ft



DCP TEST DATA

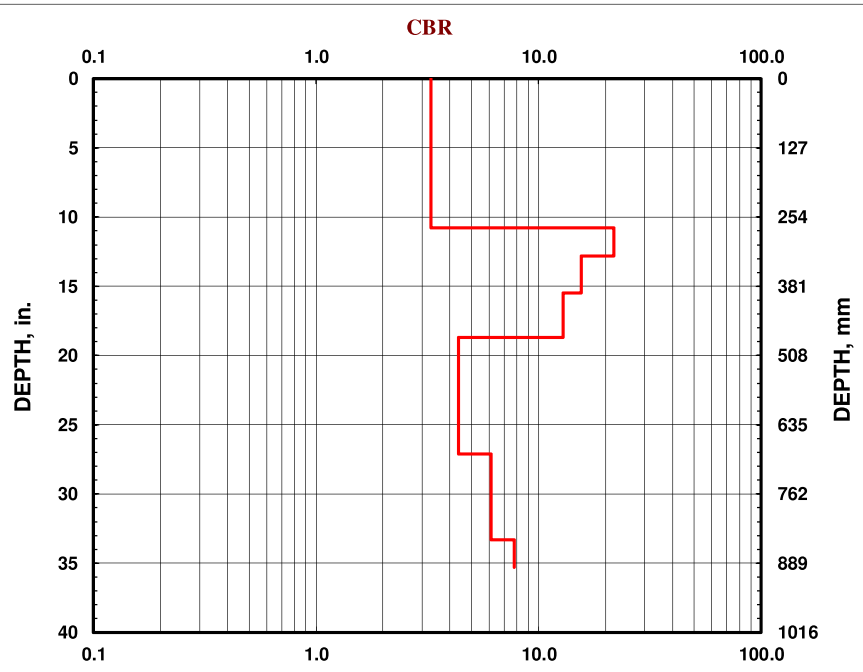
Project: Jacksonville Transit **Date:** 3-Aug-18

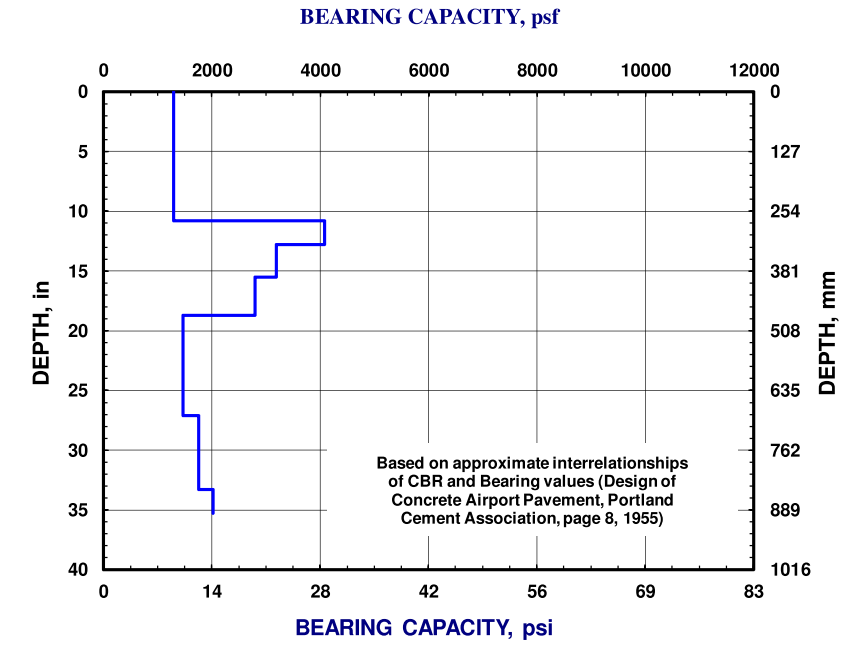
Location: K-1 **Soil Type(s):** SAND (SM) and CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Cumulative Penetration (mm)	Type of Hammer
0	0	1
5	274	1
5	325	1
5	394	1
5	475	1
5	688	1
5	846	1
2	897	1





DCP TEST DATA

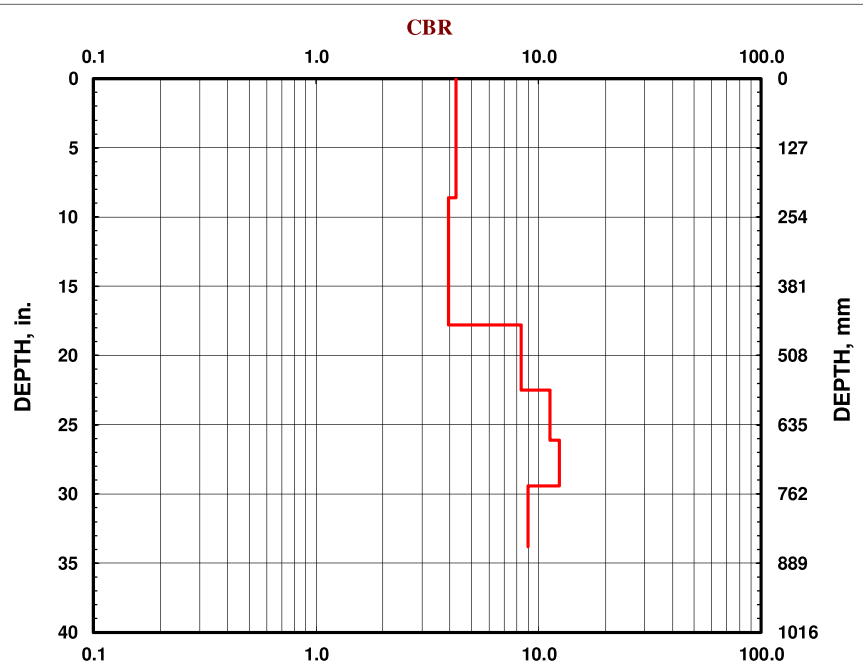
Project: Jacksonville Transit **Date:** 3-Aug-18

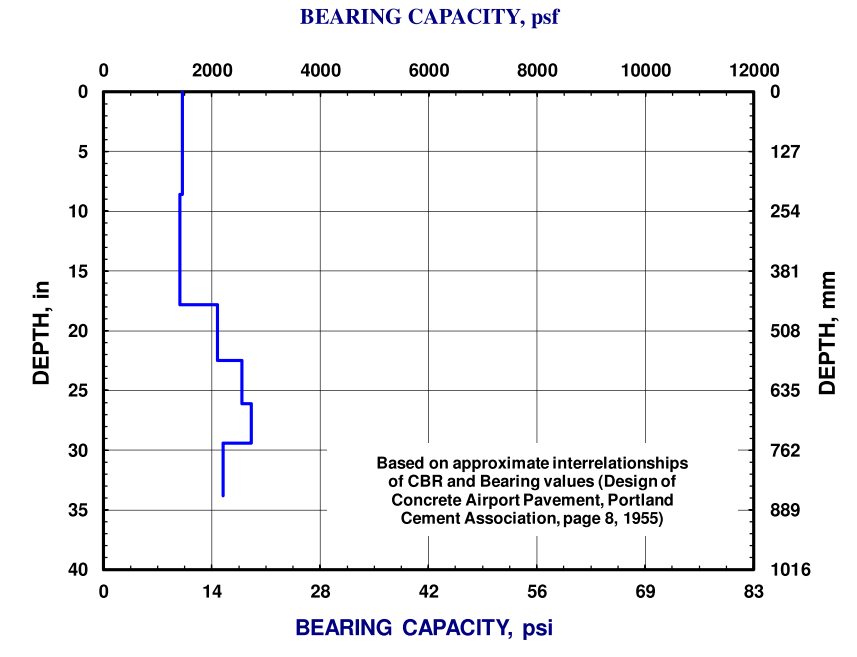
Location: K-2 **Soil Type(s):** CLAY (CL)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Cumulative Penetration (mm)	Type of Hammer
0	0	1
5	218	1
5	452	1
5	572	1
5	663	1
5	747	1
5	859	1



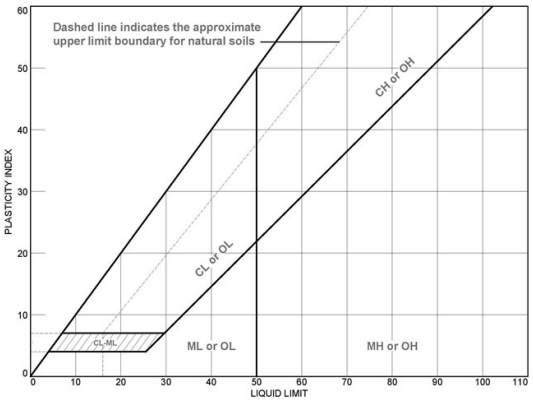


Unified Soil Classification System
(ASTM Designation D-2487)

Major Division		Group Symbol	Typical Names	Classification Criteria
Coarse-grained soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	$C_u = D_{60}/D_{10}$ Greater than 4 $C_z = (D_{30})^2/(D_{10}xD_{60})$ Between 1 and 3
		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Not meeting both criteria for GW
		GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits plot below "A" line or plasticity index less than 4
		GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits plot above "A" line and plasticity index greater than 7
	Sands: More than 50% of coarse fraction passes No. 4 sieve	SW	Well-graded sands and gravelly sands, little or no fines	$C_u = D_{60}/D_{10}$ Greater than 6 $C_z = (D_{30})^2/(D_{10}xD_{60})$ Between 1 and 3
		SP	Poorly graded sands and gravelly sands, little or no fines	Not meeting both criteria for SW
		SM	Silty sands, sand-silt mixtures	Atterberg limits plot below "A" line or plasticity index less than 4
		SC	Clayey sands, sand-clay mixtures	Atterberg limits plot above "A" line and plasticity index greater than 7
Fine-grained soils: 50% or more passing No. 200 sieve	Silts and Clays: Liquid limit 50% or less	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		OL	Organic silts and organic silty clays of low plasticity	
	Silts and Clays: Liquid limit greater than 50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	
		CH	Inorganic clays of high plasticitiy, fat clays	
		OH	Organic clays of medium to high plasticity	
Highly organic soils		Pt	Peat, muck and other highly organic soils	Fibrous organic matter; will char, burn, or glow

Classification on basis of percentage of fines
Less than 5% Pass No. 200 sieve — GW, GP, SW, SP
More than 12% Pass No. 200 sieve — GM, GC, SM, SC
5% to 12% Pass No. 200 sieve — Borderline classification requiring use of dual symbol

Note: U-line represents approximate upper limit of LL and PI combinations for natural soils (empircally determined). ASTM-D2487.



Plasticity chart for the classification of fine-grained soils.
Tests made on fraction finer than No. 40 sieve

UNIFIED SOIL CLASSIFICATION SYSTEM

CLIENT	Job #:	BORING #	SHEET
H.R. Associates, P.A.	22:26962	K-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Jacksonville Transit	H.R. Associates, P.A.

SITE LOCATION: Jacksonville, Onslow County, North Carolina

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					TOPSOIL [4"]			
					(CL) SANDY CLAY, gray, moist, trace roots			
1					(SM) SILTY FINE SAND, gray, moist trace clay and roots			
2					(CL) SANDY CLAY, tan, wet to saturated			
3						▽		
4					END OF BORING @ 4.0'			
5								
6								

BOTTOM OF CASING ➧ | LOSS OF CIRCULATION | SURFACE ELEVATION

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 3.0 WS ☐ WD ☐	BORING STARTED 8-3-18	CAVE IN DEPTH
▽ WL(SHW) ▼ WL(ACR)	BORING COMPLETED 8-3-18	HAMMER TYPE
▽ WL	RIG FOREMAN	DRILLING METHOD Hand Auger

CLIENT	Job #:	BORING #	SHEET
H.R. Associates, P.A.	22:26962	K-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Jacksonville Transit	H.R. Associates, P.A.

SITE LOCATION: Jacksonville, Onslow County, North Carolina

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					TOPSOIL [4"]			
					(CL) SANDY CLAY, tan/orange, moist to wet, trace roots			
1								
2								
3					(ML) FINE SANDY SILT, tan/orange, wet, trace clay	▽		
					(SM) SILTY FINE SAND, tan/orange, saturated, trace clay and roots			
4					END OF BORING @ 4.0'			
5								
6								

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 3.0 WS ☐ WD ☐	BORING STARTED 8-3-18	CAVE IN DEPTH
▽ WL(SHW) ▼ WL(ACR)	BORING COMPLETED 8-3-18	HAMMER TYPE
▽ WL	RIG FOREMAN	DRILLING METHOD Hand Auger

CLIENT	Job #:	BORING #	SHEET
H.R. Associates, P.A.	22:26962	S-5	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Jacksonville Transit	H.R. Associates, P.A.

SITE LOCATION: Jacksonville, Onslow County, North Carolina

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					TOPSOIL [5"]			
					(GP FILL) GRAVEL, gray, moist			
1					(SM FILL) SILTY FINE TO MEDIUM SAND, gray, moist, with gravel			
2					(SM) SILTY FINE SAND, tan, moist to wet			
					(CL) SANDY CLAY, tan/orange, wet	▽		
3					(ML) FINE SANDY SILT, tan/gray, wet, trace clay			
4					END OF BORING @ 4.0'			
5								
6								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 3 WS ☐ WD ☐	BORING STARTED 8-3-18	CAVE IN DEPTH
▽ WL(SHW) ▼ WL(ACR)	BORING COMPLETED 8-3-18	HAMMER TYPE
▽ WL	RIG FOREMAN	DRILLING METHOD Hand Auger

CLIENT	Job #:	BORING #	SHEET
H.R. Associates, P.A.	22:26962	S-8	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Jacksonville Transit	H.R. Associates, P.A.

SITE LOCATION: Jacksonville, Onslow County, North Carolina

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT²

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					TOPSOIL [5"]			
1					(SM) SILTY FINE SAND, gray, saturated, trace clay from 2' to 2.5'			
2								
3					HAND AUGER REFUSAL @ 2.5'			
4								
5								
6								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 0.1 WS ☐ WD ☐	BORING STARTED 8-3-18	CAVE IN DEPTH
WL(SHW) WL(ACR)	BORING COMPLETED 8-3-18	HAMMER TYPE
WL	RIG FOREMAN	DRILLING METHOD Hand Auger

APPENDIX C – Supplemental Report Documents

GBA Document

SECTION 01050 - FIELD ENGINEERING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. General: This Section specifies administrative and procedural requirements for field-engineering services including, but not limited to, the following:

1.2.1.1. Land survey work.

1.2.1.2. Civil-engineering services.

1.2.1.3. Damage surveys.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Coordination" for procedures for coordinating field engineering with other construction activities.

1.2.2.2. Division 1 Section "Submittals" for submitting Project record surveys.

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

1.3. **SUBMITTALS:**

1.3.1. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements.

1.3.2. Final Property Survey: Submit in PDF and CAD format the final property survey.

1.3.3. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Submittals" and "Project Closeout" Sections.

1.4. **QUALITY ASSURANCE:**

1.4.1. Surveyor Qualifications: Engage a land surveyor registered in the state where the Project is located, to perform required land-surveying services.

1.4.2. Engineer Qualifications: Engage an engineer of the discipline required, licensed in the state where the Project is located, to perform required engineering services.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1. Identification: The Owner will identify existing control points and property line corner stakes.

3.1.2. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

3.1.2.1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.

3.1.2.2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.

3.1.3. Establish and maintain a minimum of 2 permanent benchmarks on the site, referenced to data established by survey control points.

3.1.3.1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

3.1.4. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.

3.1.4.1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.

3.2. **PERFORMANCE:**

3.2.1. Work from lines and levels established by the property survey. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

3.2.1.1. Advise entities engaged in construction activities of marked lines and levels provided for their use.

3.2.1.2. As construction proceeds, check every major element for line, level, and plumb.

3.2.2. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.

3.2.2.1. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

3.2.2.2. On completion of site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.

3.2.3. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.

3.2.4. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.

3.2.5. Final Property Survey: Prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey.

3.2.5.1. Recording: At Substantial Completion, have the final property survey recorded by or with local governing authorities as the official "property survey."

END SECTION 01050

SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **DEFINITIONS:**

1.2.1. General: Basic contract definitions are included in the Conditions of the Contract.

1.2.2. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

1.2.3. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.

1.2.4. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

1.2.5. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

1.2.6. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

1.2.7. "Install": The term "install" describes operations at the Project Site including the actual unloading; unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

1.2.8. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

1.2.9. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1.2.9.1. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.

1.2.9.2. Trades: Using terms 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 tradespersons of the corresponding generic name.

1.2.9.3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

1.2.9.3.1. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

1.2.10. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work 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 on which the Project is to be built.

1.2.11. "Testing Agencies": A testing agency 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.

1.3. **SPECIFICATION FORMAT AND CONTENT EXPLANATION:**

1.3.1. Specification Format: These Specifications are organized into Divisions and Sections based on CSI's 16-Division.

1.3.2. Specification Content: This Specification uses certain conventions regarding the style 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:

1.3.2.1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

1.3.2.2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

1.3.2.2.1. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

1.4. **INDUSTRY STANDARDS:**

1.4.1. 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 to the extent referenced. Such standards are made a part of the Contract Documents by reference.

1.4.2. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

1.4.3. Conflicting Requirements: Where compliance with 2 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 to the Architect before proceeding; for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.

1.4.3.1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. 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 the requirements. Refer uncertainties to the Architect for a decision before proceeding.

1.4.4. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1.4.4.1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

1.4.5. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in the Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

AA Aluminum Association
900 19th St., NW, Suite 300
Washington, DC 20006 (202) 862-5104

AABC Associated Air Balance Council
1518 K St., NW
Washington, DC 20005 (202) 737-0202

AAMA American Architectural Manufacturers Assoc.
1540 E. Dundee Road, Suite 310
Palatine, IL 60067 (708) 202-1350

AAN American Association of Nurserymen
1250 Eye St., NW, Suite 500
Washington, DC 20005 (202) 789-2900

AASHTO American Association of State Highway and Transportation Officials
444 North Capitol St., Suite 249
Washington, DC 20001 (202) 624-5800

ACI	American Concrete Institute P.O. Box 19150 Detroit, MI 48219 (313) 532-2600
ACIL	American Council of Independent Laboratories 1629 K St., NW Washington, DC 20006 (202) 887-5872
ACPA	American Concrete Pipe Assoc. 8300 Boone Blvd., Suite 400 Vienna, VA 22182 (703) 821-1990
AGA	American Gas Assoc. 1515 Wilson Blvd. Arlington, VA 22209 (703) 841-8400
AI	Asphalt Institute Research Park Dr. P.O. Box 14052 Lexington, KY 40512-4052 (606) 288-4960
AIA	American Insurance Assoc. 1130 Connecticut Ave., NW, Suite 1000 Washington, DC 20036 (202) 828-7100
AIAC	American Institute of Steel Construction One East Wacker Drive, Suite 3100 Chicago, IL 60601-2001 (312) 670-2400
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875 (301) 972-1700
AMCA	Air Movement and Control Assoc. 30 W. University Dr. Arlington Heights, IL 60004-1893 (708) 394-0150
ANSI	American National Standards Institute 11 West 42nd St., 13th Floor New York, NY 10036 (212) 642-4900
APA	American Plywood Assoc. P.O. Box 11700 Tacoma, WA 98411 (206) 565-6600

ARI	Air-Conditioning and Refrigeration Institute 4301 Fairfax Dr., Suite 425 Arlington, VA 22203 (703) 524-8800
ASC	Adhesive and Sealant Council 1627 K St., NW, Suite 1000 Washington, DC 20006-1707 (202) 452-1500
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329 (404) 636-8400
ASME	American Society of Mechanical Engineers 345 East 47th St. New York, NY 10017 (212) 705-7722
ASPE	American Society of Plumbing Engineers 3617 Thousand Oaks Blvd., Suite 210 Westlake, CA 91362 (805) 495-7120
ASTM	American Society for Testing and Materials 1916 Race St. Philadelphia, PA 19103-1187 (215) 299-5400
AWI	Architectural Woodwork Institute P.O. Box 1550 13924 Braddock Rd., No. 100 Centerville, VA 22020 (703) 222-1100
AWPA	American Wood Preservers' Assoc. P.O. Box 286 Woodstock, MD 21163-0286 (410) 465-3169
AWPB	American Wood Preservers' Bureau (This organization is now defunct.)
AWS	American Welding Society 550 LeJeune Rd., NW Miami, FL 33126 (305) 443-9353
BHMA	Builders' Hardware Manufacturers Assoc. 355 Lexington Ave., 17th Floor New York, NY 10017 (212) 661-4261

CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Rd. Schaumburg, IL 60173 (708) 517-1200
DHI	Door and Hardware Institute 14170 Newbrook Dr. Chantilly, VA 22021-2223 (703) 222-2010
FCIB	Floor Covering Installation Board 310 Holiday Ave. Dalton, GA 30720 (706) 226-5488
FM	Factory Mutual Systems 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062 (617) 762-4300
IESNA	Illuminating Engineering Society of North America 345 E. 47th St. New York, NY 10017 (212) 705-7913
ISA	Instrument Society of America P.O. Box 12277 67 Alexander Dr. Research Triangle Park, NC 27709 (919) 549-8411
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr. Rockville, MD 20850-4329 (301) 869-5800
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park St., NE Vienna, VA 22180 (703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal St., Suite 400 Chicago, IL 60605 (312) 922-6222
NAIMA	North American Insulation Manufacturers Assoc. 44 Canal Center Plaza, Suite 310 Alexandria, VA 22314 (703) 684-0084

NAPA	National Asphalt Pavement Assoc. NAPA Building 5100 Forbes Blvd. Lanham, MD 20706-4413 (301) 731-4748
NBHA	National Builders Hardware Assoc. (Now DHI)
NEC	National Electrical Code (from NFPA)
NECA	National Electrical Contractors Assoc. 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814 (301) 657-3110
NEMA	National Electrical Manufacturers Assoc. 2101 L St., NW, Suite 300 Washington, DC 20037 (202) 457-8400
NFPA	National Fire Protection Assoc. One Batterymarch Park P.O. Box 9101 Quincy, MA 02269-9101 (617) 770-3000 (800) 344-3555
NLGA	National Lumber Grades Authority 4400 Dominion St., Suite 103 Burnaby, BC V5G 4G3 (604) 451-7323
NPCA	National Paint and Coatings Assoc. 1500 Rhode Island Ave., NW Washington, DC 20005 (202) 462-6272
NRCA	National Roofing Contractors Assoc. 10255 W. Higgins Rd., Suite 600 Rosemont, IL 60018-5607 (708) 299-9070
PCA	Portland Cement Assoc. 5420 Old Orchard Rd. Skokie, IL 60077 (708) 966-6200
PDI	Plumbing and Drainage Institute c/o Sol Baker 1106 W. 77th St., South Dr. Indianapolis, IN 46260 (317) 251-6970

RFCI Resilient Floor Covering Institute
966 Hungerford Dr., Suite 12-B
Rockville, MD 20805 (301) 340-8580

SDI Steel Door Institute
30200 Detroit Rd.
Cleveland, OH 44145(216) 889-0010

SGCC Safety Glazing Certification Council
c/o ETL Testing Laboratories
Route 11, Industrial Park
Cortland, NY 13045 (607) 753-6711

SMACNA Sheet Metal and Air Conditioning Contractors National Assoc.
4201 Lafayette Center Dr.
Chantilly, VA 22021 (703) 803-2980

SPIB Southern Pine Inspection Bureau
4709 Scenic Highway
Pensacola, FL 32504 (904) 434-2611

UL Underwriters Laboratories
333 Pfingsten Rd.
Northbrook, IL 60062 (708) 272-8800

WRI Wire Reinforcement Institute
1101 Connecticut Ave. NW, Suite 700
Washington, DC 20036-4303 (202) 429-5125

1.4.6. Federal Government Agencies: Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

CFR Code of Federal Regulations
(Available from the Government Printing Office)
N. Capitol St. between G and H St., NW
Washington, DC 20402 (202) 783-3238
(Material is usually first published in the "Federal Register")

CPSC Consumer Product Safety Commission
5401 Westbard Ave.
Bethesda, MD 20207 (800) 638-2772

EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460 (202) 382-2090

OSHA Occupational Safety and Health
Administration
(U.S. Department of Labor)
200 Constitution Ave., NW
Washington, DC 20210 (202) 219-6091

1.5. **SUBMITTALS:**

1.5.1. Permits, Licenses, and Certificates: For the 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 in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END SECTION 01095

SECTION 01102 - APPLICABLE DOCUMENTS

PART 1 - GENERAL

1.1 Documents shall be included in the Contract as described herein.

1.2 Proposals shall include provisions of the Documents listed.

PART 2 - DESIGNATION

2.1 Drawings shall consist of the sheets listed in the Index of Drawings on the Cover sheet.

2.2 Other Documents: shall consist of the following:

2.2.1 General Documents: All Contracts shall include the Conditions and the General Requirements (Division 0 and Division 1), Proposal Form.

2.2.2 In addition to the General Documents, the Contracts shall include the Specifications listed below:

2.2.2.1 General Construction: Division 0 thru Division 12.

2.2.2.2 Plumbing: Division 0 thru Division 1 and Division 15.

2.2.2.3 Mechanical: Division 0 thru Division 1 and Division 15.

2.2.2.4 Fire Protection: Division 0 thru Division 1 and Division 15.

2.2.2.5 Electrical: Division 0 thru Division 1 and Division 16.

2.2.2.6 Divisions listed above shall include all sections listed in the Table of Contents.

END OF SECTION 01102

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:

1.2.1.1. Pre-construction conference.

1.2.1.2. Pre-installation conferences.

1.2.1.3. Progress meetings.

1.2.1.4. Coordination meetings.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Coordination" for procedures for coordinating project meetings with other construction activities.

1.2.2.2. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

1.3. **PRECONSTRUCTION CONFERENCE:**

1.3.1. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect, but no later than 15 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1.3.2. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work

1.3.3. Agenda: Discuss items of significance that could affect progress, including the following:

1.3.3.1. Tentative construction schedule.

1.3.3.2. Critical work sequencing.

1.3.3.3. Designation of responsible personnel.

1.3.3.4. Procedures for processing field decisions and Change Orders.

1.3.3.5. Procedures for processing Applications for Payment.

1.3.3.6. Distribution of Contract Documents.

1.3.3.7. Submittal of Shop Drawings, Product Data, and Samples.

1.3.3.8. Preparation of record documents.

1.3.3.9. Use of the premises.

1.3.3.10. Parking availability.

1.3.3.11. Office, work, and storage areas.

1.3.3.12. Equipment deliveries and priorities.

1.3.3.13. Safety procedures.

1.3.3.14. First aid.

1.3.3.15. Security.

1.3.3.16. Housekeeping.

1.3.3.17. Working hours.

1.4. **PREINSTALLATION CONFERENCES:**

1.4.1. Conduct a preinstallation conference at the Project Site before each construction activity that requires coordination with other construction.

1.4.2. Attendees: The 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 the Architect of scheduled meeting dates.

1.4.2.1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference.

1.4.2.2. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.

1.4.2.3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5. **PROGRESS MEETINGS:**

1.5.1. Conduct progress meetings at the project site at two (2) week intervals. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

1.5.2. Attendees: In addition to representatives of the Owner and the Architect, each subcontractor, supplier, or 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 the Project and authorized to conclude matters relating to the Work.

1.5.3. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

1.5.3.1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind 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.

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

1.5.3.2.1. Interface requirements.

1.5.3.2.2. Time.

1.5.3.2.3. Sequences.

1.5.3.2.4. Status of submittals.

1.5.3.2.5. Deliveries.

1.5.3.2.6. Off-site fabrication problems.

1.5.3.2.7. Access.

1.5.3.2.8. Site utilization.

1.5.3.2.9. Temporary facilities and services.

1.5.3.2.10. Hours of work.

1.5.3.2.11. Hazards and risks.

1.5.3.2.12. Housekeeping.

1.5.3.2.13. Quality and work standards.

1.5.3.2.14. Change Orders.

1.5.3.2.15. Documentation of information for payment requests.

1.5.4. Reporting: No later than three (3) days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1.5.4.1. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

1.6. **COORDINATION MEETINGS:**

1.6.1. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.

1.6.2. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

1.6.3. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01200

SECTION 01230 - ALTERNATES

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and procedural requirements for alternates.

1.3 **DEFINITIONS:**

1.3.1. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1.3.1.1. The cost of the alternate is the net addition to from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 **PROCEDURES:**

1.4.1. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1.4.1.1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

1.4.2. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

1.4.3. Execute accepted alternates under the same conditions as other work of the Contract.

1.4.4. Schedule: A Schedule of Alternates is included below and as shown on the Drawings. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

1.4.4.1 Alternate No. One: Under this alternate, provide all general construction changes to overall building envelope including structural related to the NCSBC Category IV classification of the Administration/Transportation Wing as indicated on the drawings.

1.4.4.2 Alternate No. Two: Under this alternate, add all the recycled rubber shingles on the building and the base bid bus canopy, and in lieu of asphalt shingles as shown on the Drawings.

1.4.4.3 Alternate No. Three: Under this alternate, delete 12-inch thick (R-38) insulation batts with metal wire support system and provide minimum 6 1/2-inch thick (R-38) sprayed foam roof insulation as shown on the Drawings.

1.4.4.4 Alternate No. Four: Under this alternate, delete tower manually operated personnel ceiling/soffit access door and provide power-operated (including electrical power circuit) ceiling/soffit access door along with pull-down ladder assembly as shown on the drawings.

1.4.4.5 Alternate No. Five: Under this alternate, add a prefabricated roof skylight over Transit/Operations Wing – Waiting/Ticketing Area #104 as shown on the drawings.

1.4.4.6 Alternate No. Six: Under this alternate, add main bus island canopy including base bid asphalt shingle roof assembly, gutters/downspouts, and associated electrical power and lighting circuits. Concrete column footings, underground downspout/drainage piping. Conduits for electrical power and lighting, and plumbing are to be included in base bid scope as shown on the

1.4.4.7 Alternate No. Seven: Under this alternate, add main bus island canopy including recycled rubber shingle roof assembly, gutters/downspouts, and associated electrical power and lighting circuits. Concrete column footings, underground downspout/drainage piping. Conduits for electrical power and lighting, and plumbing are to be included in base bid scope as shown on the Drawings.

END OF SECTION 01230

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

1.2.1.1. Contractor's construction schedule.

1.2.1.2. Submittal schedule.

1.2.1.3. Daily construction reports.

1.2.1.4. Shop Drawings.

1.2.1.5. Product Data.

1.2.1.6. Samples.

1.2.1.7. Quality assurance submittals.

1.2.2. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1.2.2.1. Permits.

1.2.2.2. Applications for Payment.

1.2.2.3. Performance and payment bonds.

1.2.2.4. Insurance certificates.

1.2.2.5. List of subcontractors.

1.2.3. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.3.1. Division 1 Section "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.

1.2.3.2. Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.

1.2.3.3. Division 1 Section "Quality Control" specifies requirements for submittal of inspection and test reports.

1.2.3.4. Division 1 Section "Contract Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.3. **DEFINITIONS:**

1.3.1. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

1.3.1.1. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

1.3.2. Field samples are full-size physical examples erected on- site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.

1.3.3. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

1.4. **SUBMITTAL PROCEDURES:**

1.4.1. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1.4.1.1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

1.4.1.2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

1.4.1.2.1. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

1.4.1.3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.

1.4.1.3.1. Allow two (2) weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.

1.4.1.3.2. If an intermediate submittal is necessary, process the same as the initial submittal.

1.4.1.3.3. Allow two (2) weeks for reprocessing each submittal.

1.4.1.3.4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

1.4.2. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1.4.2.1. Provide a space approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.

1.4.2.2. Include the following information on the label for processing and recording action taken.

1.4.2.2.1. Project name.

1.4.2.2.2. Date.

1.4.2.2.3. Name and address of the Architect.

1.4.2.2.4. Name and address of the Contractor.

1.4.2.2.5. Name and address of the subcontractor.

1.4.2.2.6. Name and address of the supplier.

1.4.2.2.7. Name of the manufacturer.

1.4.2.2.8. Number and title of appropriate Specification Section.

1.4.2.2.9. Drawing number and detail references, as appropriate.

1.4.3. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.

1.4.3.1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.5. **CONTRACTOR'S CONSTRUCTION SCHEDULE:**

1.5.1. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 30 days after the date established for "Commencement of the Work."

1.5.1.1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."

1.5.1.2. Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.

1.5.1.3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.

1.5.1.4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.

1.5.1.5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.

1.5.1.6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

1.5.2. Phasing: On the schedule, show how requirements for phased completion to permit Work by separate Contractors and partial occupancy by the Owner affect the sequence of Work.

1.5.3. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.

1.5.4. Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of Work performed as of the dates used for preparation of payment requests.

1.5.5. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.

1.5.5.1. When revisions are made, distribute 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 construction activities.

1.5.6. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.6. **SUBMITTAL SCHEDULE:**

1.6.1. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within ten (10) days of the date required for submittal of the Contractor's Construction Schedule.

1.6.1.1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.

1.6.1.2. Prepare the schedule in chronological order. Provide the following information:

1.6.1.2.1. Scheduled date for the first submittal.

1.6.1.2.2. Related Section number.

1.6.1.2.3. Submittal category (Shop Drawings, Product Data, or Samples).

1.6.1.2.4. Name of the subcontractor.

1.6.1.2.5. Description of the part of the Work covered.

1.6.1.2.6. Scheduled date for re-submittal.

1.6.1.2.7. Scheduled date for the Architect's final release or approval.

1.6.2. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.

1.6.2.1. When revisions are made, distribute 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 construction activities.

1.6.3. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.7. **DAILY CONSTRUCTION REPORTS:**

1.7.1. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals:

1.7.1.1. List of subcontractors at the site.

1.7.1.2. Approximate count of personnel at the site.

1.7.1.3. High and low temperatures, general weather conditions.

1.7.1.4. Accidents and unusual events.

1.7.1.5. Meetings and significant decisions.

1.7.1.6. Stoppages, delays, shortages, and losses.

1.7.1.7. Meter readings and similar recordings.

1.7.1.8. Emergency procedures.

1.7.1.9. Orders and requests of governing authorities.

1.7.1.10. Change Orders received, implemented.

1.7.1.11. Services connected, disconnected.

1.7.1.12. Equipment or system tests and startups.

1.7.1.13. Partial Completions, occupancies.

1.7.1.14. Substantial Completions authorized.

1.8. **SHOP DRAWINGS:**

1.8.1. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

1.8.2. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:

1.8.2.1. Dimensions.

1.8.2.2. Identification of products and materials included by sheet and detail number.

1.8.2.3. Compliance with specified standards.

1.8.2.4. Notation of coordination requirements.

1.8.2.5. Notation of dimensions established by field measurement.

1.8.2.6. 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 36 by 48 inches.

1.8.2.7. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print for the Architect's review. The Architect will return the reproducible print.

1.8.2.8. Final Submittal: Submit three (3) blue- or black-line prints; submit five (5) prints where required for maintenance manuals. The Architect will retain two (2) prints and return the remainder.

1.8.2.8.1. One of the prints returned shall be marked up and maintained as a "Record Document."

1.8.2.9. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.9. **PRODUCT DATA:**

1.9.1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing- in diagrams and templates, standard wiring diagrams, and performance curves.

1.9.1.1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:

1.9.1.1.1. Manufacturer's printed recommendations.

1.9.1.1.2. Compliance with trade association standards.

1.9.1.1.3. Compliance with recognized testing agency standards.

1.9.1.1.4. Application of testing agency labels and seals.

1.9.1.1.5. Notation of dimensions verified by field measurement.

1.9.1.1.6. Notation of coordination requirements.

1.9.1.2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

1.9.1.3. Submittals: Submit electronic/digital.

1.9.1.3.1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

1.9.1.4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

1.9.1.4.1. Do not proceed with installation until a copy of Product Data is in the Installer's possession.

1.9.1.4.2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.10. **SAMPLES:**

1.10.1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

1.10.1.1. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:

1.10.1.1.1. Specification Section number and reference.

1.10.1.1.2. Generic description of the Sample.

1.10.1.1.3. Sample source.

1.10.1.1.4. Product name or name of the manufacturer.

1.10.1.1.5. Compliance with recognized standards.

1.10.1.1.6. Availability and delivery time.

1.10.1.2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

1.10.1.2.1. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.

1.10.1.2.2. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

1.10.1.2.3. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.

1.10.1.2.4. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.

1.10.1.3. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.

1.10.1.3.1. The Architect will review and return preliminary submittals with the Architect's notation, indicating selection and other action.

1.10.1.4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 2 sets. The Architect will return one set marked with the action taken.

1.10.1.5. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.

1.10.1.5.1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

1.10.1.5.2. Sample sets may be used to obtain final acceptance of the construction associated with each set.

1.10.2. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1.10.2.1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.

1.10.2.1.1. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.11. **QUALITY ASSURANCE SUBMITTALS:**

1.11.1. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

1.11.2. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

1.11.2.1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

1.11.3. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

1.12. **ARCHITECT'S ACTION:**

1.12.1. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.

1.12.1.1. Compliance with specified characteristics is the Contractor's responsibility.

1.12.2. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:

1.12.2.1. Final Unrestricted Release: When the Architect marks a submittal "Approved," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.

1.12.2.2. Final-But-Restricted Release: When the Architect marks a submittal "Approved as Noted," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.

1.12.2.3. Returned for Resubmittal: When the Architect marks a submittal "Not Approved, Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.

1.12.2.3.1. Do not use, or allow others to use, submittals marked "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.

1.12.2.4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."

1.12.3. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01300

01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

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

1.2.1.1. General project coordination procedures.

1.2.1.2. Conservation.

1.2.1.3. Administrative and supervisory personnel.

1.2.1.4. Project meetings.

1.2.1.5. Requests for Interpretation (RFIs).

1.2.2. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

1.2.3. Related Sections include the following:

1.2.3.1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.

1.2.3.2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2.3.3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3. **DEFINITIONS:**

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

1.4. **COORDINATION:**

1.4.1. 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.

1.4.1.1. 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.

1.4.1.2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.

1.4.1.3. Make adequate provisions to accommodate items scheduled for later installation.

1.4.1.4. 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.

1.4.2. If necessary, 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.

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

1.4.3. 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:

1.4.3.1. Preparation of Contractor's Construction Schedule.

1.4.3.2. Preparation of the Schedule of Values.

1.4.3.3. Installation and removal of temporary facilities and controls.

1.4.3.4. Delivery and processing of submittals.

1.4.3.5. Progress meetings.

1.4.3.6. Project closeout activities.

1.4.3.7. Startup and adjustment of systems.

1.4.3.8. Project closeout activities.

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

1.4.4.1. 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:**

1.5.1. Key Personnel Names: Within ten (10) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.5.1.1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6. **ADMINISTRATIVE AND SUPERVISORY PERSONNEL:**

1.6.1. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.6.1.1. Include special personnel required for coordination of operations with other contractors.

1.7. **PROJECT MEETINGS:**

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

1.7.1.1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.

1.7.1.2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

1.7.1.3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within two (2) days of the meeting.

1.7.2. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than five (5) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1.7.2.1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

1.7.2.2. Agenda: Discuss items of significance that could affect progress, including the following:

1.7.2.2.1. Tentative construction schedule.

1.7.2.2.2. Critical work sequencing and long-lead items.

1.7.2.2.3. Designation of key personnel and their duties.

1.7.2.2.4. Procedures for processing field decisions and Change Orders.

1.7.2.2.5. Procedures for RFIs.

1.7.2.2.6. Procedures for processing Applications for Payment.

1.7.2.2.7. Distribution of the Contract Documents.

1.7.2.2.8. Submittal procedures.

1.7.2.2.9. Preparation of Record Documents.

1.7.2.2.10. Use of the premises and existing building.

1.7.2.2.11. Work restrictions.

1.7.2.2.12. Owner's occupancy requirements.

1.7.2.2.13. Responsibility for temporary facilities and controls.

1.7.2.2.14. Construction waste management and recycling.

1.7.2.2.15. Parking availability.

1.7.2.2.16. Office, work, and storage areas.

1.7.2.2.17. Equipment deliveries and priorities.

1.7.2.2.18. First aid.

1.7.2.2.19. Security.

1.7.2.2.20. Progress cleaning.

1.7.2.2.21. Working hours.

1.7.2.3. Minutes: Record and distribute meeting minutes.

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

1.7.3.1. Attendees: In addition to representatives of Owner and Architect, 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.

1.7.3.2. 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.

1.7.3.2.1. 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.

1.7.3.2.1.1. Review schedule for next period.

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

1.7.3.2.2.1. Interface requirements.

1.7.3.2.2.2. Sequence of operations.

1.7.3.2.2.3. Status of submittals.

1.7.3.2.2.4. Access.

1.7.3.2.2.5. Site utilization.

1.7.3.2.2.6. Temporary facilities and controls.

1.7.3.2.2.7. Work hours.

1.7.3.2.2.8. Hazards and risks.

1.7.3.2.2.9. Progress cleaning.

1.7.3.2.2.10. Quality and work standards.

1.7.3.2.2.11. Status of correction of deficient items.

1.7.3.2.2.12. Field observations.

1.7.3.2.2.13. RFIs.

1.7.3.2.2.14. Status of proposal requests.

1.7.3.2.2.15. Pending changes.

1.7.3.2.2.16. Status of Change Orders.

1.7.3.2.2.17. Pending claims and disputes.

1.7.3.2.2.18. Documentation of information for payment requests.

1.7.3.3. Minutes: Record the meeting minutes.

1.7.3.4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

1.7.3.4.1. 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.

1.8. **REQUESTS FOR INTERPRETATION (RFIs):**

1.8.1. 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.

1.8.1.1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.

1.8.1.2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

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

1.8.2.1. Project name.

1.8.2.2. Date.

1.8.2.3. Name of Contractor.

1.8.2.4. Name of Architect.

1.8.2.5. RFI number, numbered sequentially.

1.8.2.6. Specification Section number and title and related paragraphs, as appropriate.

1.8.2.7. Drawing number and detail references, as appropriate.

1.8.2.8. Field dimensions and conditions, as appropriate.

1.8.2.9. 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.

1.8.2.10. Contractor's signature.

1.8.2.11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

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

1.8.3. Form of RFIs: Electronic version of AIA Form G716 shall be used.

1.8.3.1. Attachments shall be electronic files in Adobe Acrobat PDF format.

1.8.4. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow five (5) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1.8.4.1. The following RFIs will be returned without action:

1.8.4.1.1. Requests for approval of submittals.

1.8.4.1.2. Requests for approval of substitutions.

1.8.4.1.3. Requests for coordination information already indicated in the Contract Documents.

1.8.4.1.4. Requests for adjustments in the Contract Time or the Contract Sum.

1.8.4.1.5. Requests for interpretation of Architect's actions on submittals.

1.8.4.1.6. Incomplete RFIs or RFIs with numerous errors.

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

1.8.4.3. Architect'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 Proposal according to General Conditions.

1.8.4.3.1. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five (5) days of receipt of the RFI response.

1.8.5. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within five (5) days if Contractor disagrees with response.

1.8.6. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Software log with not less than the following:

1.8.6.1. Project name.

1.8.6.2. Name and address of Contractor.

1.8.6.3. Name and address of Architect.

1.8.6.4. RFI number including RFIs that were dropped and not submitted.

1.8.6.5. RFI description.

1.8.6.6. Date the RFI was submitted.

1.8.6.7. Date Architect's response was received.

1.8.6.8. 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 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and procedural requirements for quality-control services.

1.2.2. Quality-control services include inspections, tests, and related actions, including reports performed by Owner under separate contract. They do not include contract enforcement activities performed by Architect.

1.2.3. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

1.2.4. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1.2.4.1. Specific quality-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.

1.2.4.2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.

1.2.5. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.5.1. Division 1 Section "Submittals" specifies requirements for development of a schedule of required tests and inspections.

1.3. **RESPONSIBILITIES:**

1.3.1. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Owner shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

1.3.1.1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.

1.3.1.2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will engage the services of a qualified independent testing agency to perform those services. Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders.

1.3.1.2.1. Owner will engage a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.

1.3.2. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality- control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1.3.2.1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.

1.3.3. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1.3.3.1. Provide access to the Work.

1.3.3.2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.

1.3.3.3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.

1.3.3.4. Provide facilities for storage and curing of test samples.

1.3.3.5. Deliver samples to testing laboratories.

1.3.3.6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

1.3.3.7. Provide security and protection of samples and test equipment at the Project Site.

1.3.4. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1.3.4.1. The agency shall notify the Owner, Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

1.3.4.2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

1.3.4.3. The agency shall not perform any duties of the Contractor.

1.3.5. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1.3.5.1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4. **SUBMITTALS:**

1.4.1. Unless the Owner is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

1.4.1.1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

1.4.1.2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

1.4.1.2.1. Date of issue.

1.4.1.2.2. Project title and number.

1.4.1.2.3. Name, address, and telephone number of testing agency.

1.4.1.2.4. Dates and locations of samples and tests or inspections.

1.4.1.2.5. Names of individuals making the inspection or test.

1.4.1.2.6. Designation of the Work and test method.

1.4.1.2.7. Identification of product and Specification Section.

1.4.1.2.8. Complete inspection or test data.

1.4.1.2.9. Test results and an interpretation of test results.

1.4.1.2.10. Ambient conditions at the time of sample taking and testing.

1.4.1.2.11. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

1.4.1.2.12. Name and signature of laboratory inspector.

1.4.1.2.13. Recommendations on retesting.

1.5. **QUALITY ASSURANCE:**

1.5.1. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1.5.1.1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **REPAIR AND PROTECTION:**

3.1.1. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

3.1.2. Protect construction exposed by or for quality-control service activities and protect repaired construction.

3.1.3. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 01400

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.

1.2.2. Temporary utilities include, but are not limited to, the following:

1.2.2.1. Water service and distribution.

1.2.2.2. Temporary electric power and light.

1.2.2.3. Temporary heat.

1.2.2.4. Ventilation.

1.2.2.5. Telephone service.

1.2.2.6. Sanitary facilities, including drinking water.

1.2.2.7. Storm and sanitary sewer.

1.2.3. Support facilities include, but are not limited to, the following:

1.2.3.1. Field offices and storage sheds.

1.2.3.2. Temporary roads and paving.

1.2.3.3. Temporary enclosures.

1.2.3.4. Temporary project identification signs and bulletin boards.

1.2.3.5. Waste disposal services.

1.2.3.6. Rodent and pest control.

1.2.3.7. Construction aids and miscellaneous services and facilities.

1.2.4. Security and protection facilities include, but are not limited to, the following:

1.2.4.1. Temporary fire protection.

1.2.4.2. Barricades, warning signs, and lights.

1.2.4.3. Enclosure fence for the site.

1.2.4.4. Environmental protection.

1.3. **SUBMITTALS:**

1.3.1. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

1.4. **QUALITY ASSURANCE:**

1.4.1. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1.4.1.1. Building code requirements.

1.4.1.2. Health and safety regulations.

1.4.1.3. Utility company regulations.

1.4.1.4. Police, fire department, and rescue squad rules.

1.4.1.5. Environmental protection regulations.

1.4.2. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1.4.2.1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

1.4.3. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5. **PROJECT CONDITIONS:**

1.5.1. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

1.5.2. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1. **MATERIALS:**

2.1.1. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

2.1.2. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."

2.1.2.1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.

2.1.2.2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.

2.1.3. For safety barriers and similar uses, provide minimum 5/8-inch thick exterior plywood.

2.1.4. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

2.1.5. Water: Provide potable water approved by local health authorities.

2.1.6. Open-Mesh Fencing: Provide 0.120-inch thick, galvanized 2-inch chain link fabric fencing 6 feet high with galvanized barbed-wire top strand and galvanized steel pipe posts, 1-1/2 inches I.D. for line posts and 2-1/2 inches I.D. for corner posts.

2.2. **EQUIPMENT:**

2.2.1. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

2.2.2. Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

2.2.3. Electrical Outlets: Provide properly configured, NEMA- polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

2.2.4. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

2.2.5. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

2.2.6. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

2.2.7. Temporary Office: Provide prefabricated or mobile unit or similar job-built construction with lockable entrances, large folding table for meetings, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.

2.2.8. Temporary Toilet Units: Provide self-contained, single- occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

2.2.9. Fire Extinguishers: Provide hand-carried, portable, UL- rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

2.2.9.1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1. **INSTALLATION:**

3.1.1. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

3.1.2. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2. **TEMPORARY UTILITY INSTALLATION:**

3.2.1. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

3.2.1.1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.

3.2.1.2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

3.2.1.3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

3.2.1.4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect. Neither the Owner nor Architect will accept cost or use charges as a basis of claims for Change Orders. Except as noted in the General Conditions.

3.2.2. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

3.2.2.1. Sterilization: Sterilize temporary water piping prior to use.

3.2.3. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.

3.2.3.1. Install electric power service underground, except where overhead service must be used.

3.2.3.2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

3.2.4. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.

3.2.4.1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

3.2.5. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

3.2.6. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP- gas or fuel-oil heaters with individual space thermostatic control.

3.2.6.1. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

3.2.7. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.

3.2.8. Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

3.2.8.1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

3.2.9. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

3.2.10. Drinking-Water Fixtures: Provide drinking-water fountains where indicated, including paper cup supply.

3.2.10.1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.

3.2.11. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.

3.2.11.1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.

3.2.11.2. Connect temporary sewers to the municipal system, as directed by sewer department officials.

3.2.11.3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

3.2.12. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3. **SUPPORT FACILITIES INSTALLATION:**

3.3.1. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.

3.3.1.1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

3.3.2. Provide incombustible construction for offices, shops, and sheds located within the construction area or within 30 feet of building lines. Comply with requirements of NFPA 241.

3.3.3. Field Office: Provide insulated, weathertight temporary office of sufficient size to accommodate required office personnel at the project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:

3.3.3.1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table, plan rack, and a 6-shelf bookcase.

3.3.3.2. Equip with a water cooler and private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.

3.3.4. Owners Field Office: Office area consisting of desk and drawing table, along with telephone/fax connection in contractor trailer.

3.3.5. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on- site.

3.3.6. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.

3.3.6.1. Paving: Comply with Division 2 Section "Hot-Mixed Asphalt Paving" for construction and maintenance of temporary paving.

3.3.6.2. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.

3.3.6.3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.

3.3.6.4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.

3.3.6.5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.

3.3.7. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.

3.3.8. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

3.3.8.1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

3.3.8.2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq. ft. or less with plywood or similar materials.

3.3.8.3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.

3.3.8.4. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use UL-labeled, fire- retardant-treated material for framing and main sheathing.

3.3.9. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.3.10. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

3.3.10.1. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

3.3.11. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

3.3.12. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

3.4. **SECURITY AND PROTECTION FACILITIES INSTALLATION:**

3.4.1. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.

3.4.2. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

3.4.2.1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.

3.4.2.2. Store combustible materials in containers in fire-safe locations.

3.4.2.3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.

3.4.2.4. Provide supervision of welding operations, combustion- type temporary heating units, and similar sources of fire ignition.

3.4.3. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

3.4.4. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

3.4.5. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

3.4.5.1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

3.4.6. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5. **OPERATION, TERMINATION, AND REMOVAL:**

3.5.1. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

3.5.2. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

3.5.2.1. 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.

3.5.2.2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

3.5.3. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when 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 the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

3.5.3.1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.

3.5.3.2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.

3.5.3.3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:

3.5.3.3.1. Replace air filters and clean inside of ductwork and housings.

3.5.3.3.2. Replace significantly worn parts and parts subject to unusual operating conditions.

3.5.3.3.3. Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION 01500

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.

1.2.2.2. Division 1 Section "Submittals" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.

1.2.2.3. Division 1 Section "Substitutions" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3. **DEFINITIONS:**

1.3.1. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self- explanatory and have well-recognized meanings in the construction industry.

1.3.1.1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1.3.1.1.1. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.3.1.2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

1.3.1.3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4. **SUBMITTALS:**

1.4.1. Product List: Prepare a list showing products specified in tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

1.4.1.1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.

1.4.1.2. Initial Submittal: Within 15 days after date of commencement of the Work, submit three (3) copies of an initial product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

1.4.1.2.1. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period.

1.4.1.3. Completed List: Within 45 days after date of commencement of the Work, submit 3 copies of the completed product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

1.4.1.4. Architect's Action: The Architect will respond in writing to Contractor within 2 weeks of receipt of the completed product list. No response within this period constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. The Architect's response will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.5. **QUALITY ASSURANCE:**

1.5.1. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

1.5.2. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5.2.1. Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other or separate contractors.

1.5.2.2. If a dispute arises between prime contractors over concurrently selectable, but incompatible products, the Architect will determine which products shall be retained and which are incompatible and must be replaced.

1.5.3. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1.5.3.1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.

1.5.3.2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

1) Name of product and manufacturer.
2) Model and serial number.
3) Capacity.
4) Speed.
5) Ratings.

1.6. **PRODUCT DELIVERY, STORAGE, AND HANDLING:**

1.6.1. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1.6.1.1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.

1.6.1.2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

1.6.1.3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

1.6.1.4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

1.6.1.5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

1.6.1.6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

1.6.1.7. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1. **PRODUCT SELECTION:**

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

2.1.1.1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.

2.1.1.2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

2.1.2. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:

2.1.2.1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.

2.1.2.2. Semiproprietary Specification Requirements: Where Specifications name two (2) or more products or manufacturers, provide one (1) of the products indicated. No substitutions will be permitted.

2.1.2.2.1. Where Specifications specify products or manufacturers by name, accompanied by the term "or other manufacturer approved by Owner and Architect/Engineer", comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

2.1.2.3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

2.1.2.4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

2.1.2.5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.

2.1.2.5.1. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.

2.1.2.6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.

2.1.2.7. Visual Matching: Where Specifications require matching an established Sample or material, the Architect's decision will be final on whether a proposed product matches satisfactorily.

2.1.2.7.1. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.

2.1.2.8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.1. **INSTALLATION OF PRODUCTS:**

3.1.1. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

3.1.1.1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01600

SECTION 01631 - SUBSTITUTIONS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. 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:**

1.2.1. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.

1.2.2.2. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.

1.3. **DEFINITIONS:**

1.3.1. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

1.3.2. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

1.3.2.1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.

1.3.2.2. Revisions to the Contract Documents requested by the Owner or Architect.

1.3.2.3. Specified options of products and construction methods included in the Contract Documents.

1.3.2.4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4. **SUBMITTALS:**

1.4.1. Substitution Request Submittal: The Architect will consider requests for substitution if received within 15 days after commencement of the Work. Requests received more than 15 days after commencement of the Work may be considered or rejected at the discretion of the Owner and Architect.

1.4.1.1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.

1.4.1.2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

1.4.1.3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

1.4.1.3.1. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed substitution.

1.4.1.3.2. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.

1.4.1.3.3. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.

1.4.1.3.4. Samples, where applicable or requested.

1.4.1.3.5. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.

1.4.1.3.6. Cost information, including a proposal of the net change, if any in the Contract Sum.

1.4.1.3.7. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.

1.4.1.3.8. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

1.4.1.4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.

1.4.1.4.1. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1. **SUBSTITUTIONS:**

2.1.1. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.

2.1.1.1. Extensive revisions to the Contract Documents are not required.

2.1.1.2. Proposed changes are in keeping with the general intent of the Contract Documents.

2.1.1.3. The request is timely, fully documented, and properly submitted.

2.1.1.4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

2.1.1.5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.

2.1.1.6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.

2.1.1.7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

2.1.1.8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.

2.1.1.9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.

2.1.1.10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

2.1.1.11. Where a proposed substitution involves more than one prime contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.

2.1.2. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01631

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

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

1.2.1.1 Inspection procedures.

1.2.1.2 Project record document submittal.

1.2.1.3 Operation and maintenance manual submittal.

1.2.1.4 Submittal of warranties.

1.2.1.5 Final cleaning.

1.2.2 Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

1.3. **SUBSTANTIAL COMPLETION:**

1.3.1 Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1.3.1.1 Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

1.3.1.2 Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

1.3.1.3 Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.

1.3.1.4 Deliver tools, spare parts, extra stock, and similar items.

1.3.1.5 Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

1.3.1.6 Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.

1.3.1.7 Complete final cleanup requirements, including touchup painting.

1.3.1.8 Touch up and otherwise repair and restore marred, exposed finishes.

1.3.2 Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1.3.2.1 The Architect will repeat inspection when requested and assured that the Work is substantially complete.

1.3.2.2 Results of the completed inspection will form the basis of requirements for final acceptance.

1.4. **FINAL ACCEPTANCE:**

1.4.1 Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1.4.1.1 Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.

1.4.1.2 Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.

1.4.1.3 Submit consent of surety to final payment.

1.4.1.4 Submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.4.2 Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.

1.4.2.1 Upon completion of reinspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.4.2.2 If necessary, reinspection will be repeated.

1.5. **RECORD DOCUMENT SUBMITTALS:**

1.5.1 General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.

1.5.2 Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which 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 Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1.5.2.1 Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.

1.5.2.2 Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.

1.5.2.3 Note related change-order numbers where applicable.

1.5.2.4 Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

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

1.5.3.1 Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.

1.5.3.2 Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

1.5.3.3 Note related record drawing information and Product Data.

1.5.3.4 Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

1.5.4 Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1.5.4.1 Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

1.5.4.2 Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.

1.5.4.3 Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.

1.5.5 Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.

1.5.6 Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.

1.5.7 Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

Emergency instructions.
Spare parts list.
Copies of warranties.
Wiring diagrams.
Recommended "turn-around" cycles.
Inspection procedures.
Shop Drawings and Product Data.
Fixture lamping schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **CLOSEOUT PROCEDURES:**

3.1.1 Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

Maintenance manuals.
Record documents.
Spare parts and materials.
Tools.
Lubricants.
Fuels.
Identification systems.
Control sequences.
Hazards.
Cleaning.
Warranties and bonds.
Maintenance agreements and similar continuing commitments.

3.1.2 As part of the instruction for operating equipment, demonstrate the following procedures:

Startup.
Shutdown.
Emergency operations.
Noise and vibration adjustments.
Safety procedures.
Economy and efficiency adjustments.
Effective energy utilization.

3.2. **FINAL CLEANING:**

3.2.1 General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."

3.2.2 Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

3.2.2.1 Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

3.2.2.1.1 Remove labels that are not permanent labels.

3.2.2.1.2 Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

3.2.2.1.3 Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

3.2.2.1.4 Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

3.2.2.1.5 Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

3.2.3 Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.

3.2.4 Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

3.2.5 Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

3.2.5.1 Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 01700

SECTION 01740 - WARRANTIES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

1.2.1.1 Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 1 Section "Submittals" specifies procedures for submitting warranties.

1.2.2.2 Division 1 Section "Contract Closeout" specifies contract closeout procedures.

1.2.2.3 Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.2.2.4 Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

1.2.3 Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3. **DEFINITIONS:**

1.3.1 Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

1.3.2 Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4. **WARRANTY REQUIREMENTS:**

1.4.1 Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

1.4.2 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.

1.4.3 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 the Contract 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.

1.4.4 Owner's Recourse: Expressed 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. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1.4.4.1 Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

1.4.5 Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5. **SUBMITTALS:**

1.5.1 Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion 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 Architect.

1.5.1.1 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 fifteen (15) days of completion of that designated portion of the Work.

1.5.2 When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.

1.5.3 List of warranties are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Architect, for approval prior to final execution.

1.5.3.1 Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

1.5.4 Form of Submittal: At Final Completion compile electronic/digital required warranties properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1.5.5 Bind warranties and bonds in heavy-duty, commercial- quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

1.5.5.1 Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the Installer.

1.5.5.2 Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

1.5.5.3 When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **LIST OF WARRANTIES:**

3.1.1 Schedule: Provide warranties on products and installations as specified in the following Sections:

3.1.1.1 Termite Control Treatment: Section 02282

3.1.1.2 Landscaping: Section 02900

3.1.1.3 Membrane Waterproofing: Section 07131

3.1.1.4 Metal Wall Panels: Section 07412

3.1.1.5 Sheet Metal Roofing: Section 07610

3.1.1.6 Aluminum – Framed Entrances & Storefronts: Section 08411

3.1.1.7 Automatic Door Operators: Section 08716

3.1.1.8 Insulating Glass: Section 08800

3.1.1.9 Carpeting: Section 09680

3.1.1.10 Appliances: Section 11452 – Residential Appliances.

3.1.1.11 Split System: Section - 15784 - Split System Air Conditioning Units.

END OF SECTION 01740

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes the following:

1.2.1.1. Removal of vegetation.

1.2.1.2. Topsoil stripping.

1.2.1.3. Clearing and grubbing.

1.3. **PROJECT CONDITIONS:**

1.3.1. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

1.4. **EXISTING SERVICES:**

1.4.1. General: Indicated locations are approximate; determine exact locations before commencing Work.

1.4.2. The City of Jacksonville will arrange and pay for disconnecting and rerouting existing power and telephone utility service to the water supply well site.

1.4.3. The well blow off is to be rerouted by the contractor as part of rerouting the existing tributary. Coordinate with the City of Jacksonville before starting this work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. **SITE CLEARING:**

3.1.1. General: Remove grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.

3.1.2. Topsoil: Topsoil is defined as friable clay loam surface soil found in depth of 6 to 12 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material. Refer to the soil report for a more exact depth for each area of the site.

3.1.2.1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.

3.1.2.2. Dispose of unsuitable or excess topsoil as specified for disposal of waste material.

3.1.3. Clearing and Grubbing: Clear site of vegetation, except for those indicated to be left standing.

3.1.3.1. Completely remove debris protruding through ground surface.

3.1.3.2. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

3.1.3.2.1. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.

3.1.4. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

3.1.4.1. Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings and is included under work of related Division 15 and 16 Sections. Removing abandoned underground piping or conduits interfering with construction is included under this Section.

3.2. **DISPOSAL OF WASTE MATERIALS:**

3.2.1. Burning on Owner's Property: Burning is not permitted on Owner's property.

END OF SECTION 02100

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes the following:

1.2.1.1. Preparing and grading subgrades for building slabs-on-grade, walks, pavements, and landscaping including lawn areas.

1.2.1.2. Aggregated Piers (AP) design and installation.

1.2.1.3. Subbase course for pavements.

1.2.1.4. Excavating and backfilling for underground plumbing, electrical and fire protection utilities and appurtenances.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section.

1.2.2.1 Division 1 Section “Unit Prices” for earth removal/replacement unit prices.

1.2.2.2. Division 1 Section "Soil Boring Test" for existing site subsurface report.

1.2.2.3. Division 2 Section "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.

1.2.2.4. Division 2 Section "Landscaping" for finish grading, including placing and preparing topsoil for lawns and planting.

1.2.2.5. Division 3 Section "Cast-In-Place Concrete" for appurtenances for utility systems.

1.3. **UNIT PRICES:**

1.3.1. Earth Measurement: Volume of earth actually removed, measured in original position.

1.3.2. Unit price for earth excavation include replacement with approved materials.

1.3.3. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

1.3.3.1. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

1.3.3.2. Topsoil Borrow: Topsoil material obtained off-site.

1.3.3.3. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.

1.3.3.4. Base Course: The layer placed between the subbase and surface pavement in a paving system.

1.3.3.5. Drainage Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.

1.3.3.6. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.

1.3.3.7. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.3.4. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.4.1. Samples of the following:

1.3.4.2. 5 lb samples, sealed in air-tight containers, of each backfill/topsoil material from borrow sources.

1.3.4.3. Test Reports: In addition to test reports required under field quality control, submit the following:

1.3.4.3.1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources.

1.3.4.3.2. One optimum moisture-maximum density curve for each soil material.

1.3.4.3.3 Aggregate Pier (AP) design documents and associated calculations.

1.3.4.3.4. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.

1.3.5. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

1.3.5.1. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.3.5.1.1. Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

1.3.6. General: Provide approved borrow soil materials from off- site when sufficient approved soil materials are not available from excavations.

1.3.6.1. Satisfactory Soil Materials: ASTM D 2487 soil classification groups SM, SW, SP, SC, GC, GP, GW, and GM; free of rock or gravel larger than 2-inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter per Soils Report.

1.3.6.2. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups OH, OL, CH, and MH per Soils Report.

1.3.6.3. Backfill and Fill Materials: Satisfactory soil materials per Soils Report.

1.3.6.4. Subbase and Base Material: 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.

1.3.6.5. Engineered Fill: Subbase or base materials per Soils Report.

1.3.6.6. Bedding Material: Subbase or base materials with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

1.3.7. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1.3.7.1. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

1.3.7.2 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.

1.3.8. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

1.3.8.1. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

1.3.8.2 Provide designed dewatering system including well points and pumps if needed to proceed with construction.

1.3.9. Classified Excavation: Excavation is classified and includes excavation to required subgrade elevations. Excavation will be classified as earth excavation as follows:

1.3.9.1. Excavation includes additional 2-feet of unsuitable existing soils (as referenced in Soils Report) in the 10-foot expanded areas of the new building based on top of floor slab elevation and existing grades prior to overall site grading:

1.3.9.2. Excavation includes additional 2-feet of unsuitable existing soils (as referenced in Soils Report) in areas of the south bus island including paved drive areas on both sides prior to overall site grading.

1.3.9.3. All excavated areas to be proof rolled in presence of the soils engineer to determine that the remaining existing soils are acceptable for backfilling, as follows in 3.11.

1.3.10. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

1.3.11. Over-excavated all areas of new lawn/landscaping 24-inches below finish grade. Note, this does not include the interior of the infiltration basin but does include the perimeter landscape area around the infiltration basin.

1.3.12. Excavate areas under walks to indicated cross sections, elevations, and grades.

1.3.13. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

1.3.13.1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

1.3.13.2. Excavate trenches to uniform widths to provide a working clearance on bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1.3.13.2.1. Clearance: 12 inches each side of pipe or conduit.

1.3.13.2.2. Clearance: As indicated

1.3.13.3. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.

1.3.13.3.1. For pipes or conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

1.3.13.3.2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.

1.3.14. Notify Architect when excavations have reached required subgrade.

1.3.14.1. When Architect determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

1.3.14.1.1. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.

1.3.14.2. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.

1.3.15. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Architect.

1.3.16. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water.

1.3.16.1. Stockpile soil materials away from edge of excavations.

1.3.17. Backfill excavations promptly, but not before completing the following:

1.3.17.1. Areas of unsuitable soils excavation in the building to be backfilled with approved off-site sourced material to the elevation of the new floor slab in preparation for aggregate pier installation.

1.3.17.2. Testing, inspecting, and approval of underground utilities.

1.3.17.3. Removal of trash and debris from excavation.

1.3.18 Aggregated piers to be installed per approved design/layout documents to top of new compacted backfill as noted in 3.11.1.1 above.

1.3.18.1 Aggregate piers to be installed and tested.

1.3.19. Place and compact bedding course on unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Provide locator/tracer wire after final pipe placement.

1.3.19.1. Provide 4-inch thick concrete base slab support for piping or conduit less than 30 inches below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

1.3.19.2. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.

1.3.19.2.1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

1.3.19.3. Coordinate backfilling with utilities testing.

1.3.19.4. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.

1.3.19.5. Place and compact final backfill of satisfactory soil material to final subgrade.

1.3.20. Place and compact topsoil in areas over excavated with 8-inch lifts.

1.3.21. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.

1.3.21.1. Plow strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.

1.3.21.2. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.

1.3.21.3. Place fill material in layers to required elevations for each location listed below.

1.3.21.3.1. Under grass, use satisfactory borrow topsoil material.

1.3.21.3.2. Under walks and lawn areas, use satisfactory excavated soil material.

1.3.22. Place backfill and fill materials in layers not more than 8 inches 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.

1.3.22.1. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to Subsurface Exploration Recommendations.

1.3.22.1.1. Under pavements, compact the top 12 inches below sub-grade and each layer of backfill or fill material at 98 percent maximum dry density.

1.3.22.1.2. Under walkways, compact the top 6 inches below sub-grade and each layer of backfill or fill material at 95 percent maximum dry density.

1.3.22.1.3. Under lawn or unpaved areas, compact the top 6 inches below sub-grade and each layer of backfill or fill material at 95 percent maximum dry density.

1.3.23. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1.3.23.1. Provide a smooth transition between existing adjacent grades and new grades.

1.3.23.1.2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

1.3.22.2. Site Grading: Slope grades to direct water away from existing building and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1.3.22.2.1. Lawn or Unpaved Areas: Plus or minus 1.2 inches.

1.3.22.2.2. Walks: Plus or minus 1.2 inches.

1.3.22.2.3. Pavements: Plus or minus 1/2 inch.

1.3.23. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.

1.3.23.1. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 98 percent of ASTM D 4254 relative density.

1.3.23.2. Shape subbase and base to required crown elevations and cross-slope grades.

1.3.23.3. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.

1.3.23.4. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

1.3.24. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

1.3.24.1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.

1.3.24.1.1. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017.

1.3.24.1.2. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.

1.3.24.2. Unsuitable Soils Excavation/Backfilling: During excavation and backfilling each compacted fill and backfill layer, perform at least one field in-place density test for every 5000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

1.3.24.3. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.

1.3.24.4. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

1.3.25. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

1.3.25.1. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

1.3.25.1.1. Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.

1.3.25.2. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

1.3.25.2.1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

1.3.26. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

1.3.26.1. Disposal: Transport unsuitable existing soils to designated storage areas on off-site Owner's property. Stockpile as directed by Owner.

END OF SECTION 02200

SECTION 02282 - TERMITE CONTROL

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes soil treatment for termite control.

1.2.1.1 Exterior/interior side of perimeter concrete structural foundation.

1.2.1.2 Areas of slab-on-grade.

1.3. **SUBMITTALS:**

1.3.1. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

1.3.2. Product data and application instructions.

1.3.3. Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticides.

1.4. **QUALITY ASSURANCE:**

1.4.1. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparing substrate and application.

1.4.2. Engage a professional pest control operator who is licensed according to regulations of governing authorities to apply soil treatment solution.

1.4.3. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.5. **JOB CONDITIONS:**

1.5.1. Restrictions: Do not apply soil treatment solution until excavating, filling, and grading operations are completed, except as otherwise required in construction operations.

1.5.2. To ensure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.6. **WARRANTY:**

1.6.1. Warranty: Furnish written warranty, executed by Applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

1.6.2. Warranty Period: Five (5) years from date of Substantial Completion.

1.6.3. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1. **SOIL TREATMENT SOLUTION:**

2.1.1. General: Use an emulsible, concentrated termiticide that dilutes with water, specially formulated to prevent termite infestation. Fuel oil will not be permitted as a dilutant. Provide a solution consisting of one of following chemical elements.

2.1.2. Products: Subject to compliance with requirements, provide one of the following:

2.1.2.1. Chloropyrifos:

2.1.2.1.1. Dursban TC, Dow Chemical Co.

2.1.2.2. Permathrin:

2.1.2.2.1. Dragnet SFR, FMC Corp.

2.1.2.2.2. Torpedo, ICI Americas, Inc.

2.1.2.3. Cypermethrine:

2.1.2.3.1. Prevail FT, FMC Corp.

2.1.2.3.2. Demon, ICI Americas, Inc.

2.1.2.4. Fenvalerate:

2.1.2.4.1. Gold Coast Tribute, Du Pont.

2.1.2.5. Isofenphose:

2.1.2.5.1. Pryfon, Mobay Corp.

2.1.3. Dilute with water to concentration level recommended by manufacturer.

2.1.4. Other solutions may be used as recommended by Applicator if approved for intended application by local authorities having jurisdiction. Use only soil treatment solutions that are not harmful to plants.

PART 3 - EXECUTION

3.1. **APPLICATION:**

3.1.1. Surface Preparation: Remove foreign matter 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 foundations. Toxicants may be applied before placing compacted fill under slabs if recommended by toxicant manufacturer.

3.1.2. Application Rates: Apply soil treatment solution as follows:

3.1.2.1. Under existing slab-on-grade, treat soil before concrete replacement slab/s are placed, using the following application rates:

3.1.2.1.1. Apply 4 gallons of chemical solution per 10 linear feet to soil in critical areas under slab, including entire inside perimeter of floor slab termination, around plumbing pipes and electric conduit penetrating slab.

3.1.2.1.2. Apply 4 gallons of chemical solution per 10 linear feet of trench for each 12 inches of depth from grade to existing perimeter footing, along outside edge of building. Dig a trench 6 to 8 inches wide along outside of foundation where possible to a depth of not less than 12 inches. Punch holes to top of footing at not more than 12 inches o.c. and apply chemical solution at existing concrete grade. Mix chemical solution with the soil as it is being replaced in the trench.

3.1.2.2. At existing/new concrete floor slab joints and areas where slabs will be penetrated, apply at rate of 4 gallons per 10 linear feet of penetration.

3.1.3. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs after areas are covered by other construction.

3.1.4. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION 02282

SECTION 02511 - HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes the following:

1.2.1.1. Hot-mix asphalt paving at both bush drives including front/North drive, and both side East/West parking areas.

1.2.1.2. Pavement thermoplastic markings (direction arrows).

1.2.2. Related Sections include the following:

1.2.2.1. Division 2 Section "Earthwork" for existing aggregate (sand) subbase and new aggregate base courses and aggregate pavement shoulders.

1.2.2.2 Division 1 Section “Alternates” for hot-mixed asphalt paving in bus loading/unloading area in lieu of reinforced concrete.

1.3. **SYSTEM DESCRIPTION:**

1.3.1. Provide hot-mix asphalt pavement according to the materials, workmanship, and other applicable requirements of the standard specifications of the state or of authorities having jurisdiction.

1.3.1.1. Standard Specification: North Carolina Department of Transportation.

1.3.1.2. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.4. **SUBMITTALS:**

1.4.1. Product Data: For each product specified. Include technical data and tested physical and performance properties.

1.4.2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

1.4.3. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4.4. Material Test Reports: Indicate and interpret test results for compliance of materials with requirements indicated.

1.5. **QUALITY ASSURANCE:**

1.5.1. Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.5.2. Manufacturer Qualifications: Engage a firm experienced in manufacturing hot-mix asphalt similar to that indicated for this Project and with a record of successful in-service performance.

1.5.2.1. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the North Carolina DOT.

1.5.3. Regulatory Requirements: Conform to applicable standards of authorities having jurisdiction for asphalt paving work on public property.

1.5.4. Asphalt-Paving Publication: Comply with AI's "The Asphalt Handbook," except where more stringent requirements are indicated.

1.6. **DELIVERY, STORAGE, AND HANDLING:**

1.6.1. 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.

1.6.2. Store pavement-marking materials in a clean, dry, protected location and within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7. **PROJECT CONDITIONS:**

1.7.1. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:

1.7.1.1. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

1.7.2. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, 50 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1. **AGGREGATES:**

2.1.1. General: Use materials and gradations that have performed satisfactorily in previous installations.

2.1.2. Coarse Aggregate: Sound; angular crushed stone; or crushed gravel; or properly cured, complying with ASTM D 692.

2.1.3. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone; gravel, properly cured blast-furnace slag, or combinations thereof; complying with ASTM D 1073.

2.1.3.1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.2. **ASPHALT MATERIALS:**

2.2.1. Asphalt Cement: ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.

2.2.2. Water: Potable.

2.3. **AUXILIARY MATERIALS:**

2.3.1. Sand: ASTM D 1073, Grade Nos. 2 or 3.

2.3.2. Pavement-Marking Paint: Alkyd-resin type, ready-mixed, complying with FS TT-P-115, Type I, or AASHTO M-248, Type N.

2.3.2.1. Color: White and Yellow

2.4. **MIXES:**

2.4.1. Hot-Mix Asphalt: Provide dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI's "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:

2.4.1.1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

2.4.1.2. Base/Binder Course: Type C.

2.4.1.2.1. Reference detail on Civil Drawings.

2.4.1.3. Surface Course: Reference detail on Civil Drawings.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

3.1.2. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

3.2. **SURFACE PREPARATION:**

3.2.1. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

3.2.1.1. Sweep loose granular particles from surface of unbound- aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

3.3. **HOT-MIX ASPHALT PLACING:**

3.3.1. Machine place hot-mix asphalt mix on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness, when compacted.

3.3.1.1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.

3.3.1.2. Place hot-mix asphalt surface course in single lift.

3.3.1.3. Spread mix at minimum temperature of 250 deg F.

3.3.1.4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.

3.3.1.5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt- paving mat.

3.3.2. Place paving in consecutive strips not less than 10 feet wide, except where infill edge strips of a lesser width are required.

3.3.2.1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete asphalt base course for a section before placing asphalt surface course.

3.3.3. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4. **JOINTS:**

3.4.1. Construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

3.4.1.1. Clean contact surfaces and apply tack coat.

3.4.1.2. Offset longitudinal joints in successive courses a minimum of 6 inches.

3.4.1.3. Offset transverse joints in successive courses a minimum of 24 inches.

3.4.1.4. Construct transverse joints by bulkhead method or sawed vertical face method as described in AI's "The Asphalt Handbook."

3.4.1.5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

3.4.1.6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5. **COMPACTION:**

3.5.1. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory- plate compactors in areas inaccessible to rollers.

3.5.1.1. Complete compaction before mix temperature cools to 185 deg F.

3.5.2. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and rerolling to required elevations.

3.5.3. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

3.5.3.1. Average Density: 96 percent of reference laboratory density according to ASTM D 1559, but not less than 94 percent nor greater than 100 percent.

3.5.3.2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

3.5.4. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm. Seams with finish elevation differences of more than 1/8” will not be accepted.

3.5.5. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

3.5.6. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6. **INSTALLATION TOLERANCES:**

3.6.1. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

3.6.1.1. Base Course: Plus or minus 1/2 inch.

3.6.1.2. Surface Course: 1/8 inch.

3.6.1.3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.7. **PAVEMENT MARKING:**

3.7.1. Do not apply pavement thermoplastic markings until layout, colors, and placement have been verified with Architect, and/or NCDOT for roadway improvements.

3.7.2. Allow paving to cure for 30 days before starting pavement marking.

3.7.3. Sweep and clean surface to eliminate loose material and dust.

3.7.4. 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.

END OF SECTION 02511

SECTION 02520 - PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes exterior portland cement concrete paving and other site concrete scope as shown on the drawings, and as follows:

1.2.1.1. Pavement at the rear/south bus drive and island areas.

1.2.1.2. Bus island.

1.2.1.3. Pavement curb and gutters.

1.2.1.4. Walks.

1.2.1.5 Pavement Cross-Walks.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 2 Section "Earthwork" for subgrade preparation, grading and subbase course.

1.2.2.2. Division 3 Section "Cast-in-Place Concrete" for general applications of concrete.

1.3. **SUBMITTALS:**

1.3.1. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.

1.3.3. Design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1.3.4. Laboratory test reports for evaluation of concrete materials and mix design tests.

1.4. **QUALITY ASSURANCE:**

1.4.1. Concrete Standards: Comply with provisions of the following standards, except where more stringent requirements are indicated.

1.4.1.1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."

1.4.1.2. ACI 318, "Building Code Requirements for Reinforced Concrete."

1.4.1.3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

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

PART 2 - PRODUCTS

2.1. **FORMS:**

2.1.1. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

2.1.1.1. Use flexible or curved forms for curves of a 100-foot or less radius.

2.2. **REINFORCING MATERIALS:**

2.2.1. Reinforcing Bars and Tie Bars: ASTM A 615, Grade 60, deformed.

2.2.2. Welded Steel Wire Fabric: ASTM A 185.

2.2.2.1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Architect.

2.2.3. Deformed-Steel Welded Wire Fabric: ASTM A 497.

2.2.4. Supports for Reinforcement: Chairs, spacers, dowel bar supports and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Use wire bar-type supports complying with CRSI specifications.

2.3. **CONCRETE MATERIALS:**

2.3.1 Concrete Design Strengths

2.3.1.1 Pavement Area: 5,000 psi

2.3.1.2 All Other Areas: 3,000 psi

2.3.2. Portland Cement: ASTM C 150, Type I.

2.3.2.1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

2.3.3. Normal-Weight Aggregates: ASTM C 33, Class 4, and as follows. Provide aggregates from a single source.

2.3.3.1. Maximum Aggregate Size: 1-1/2 inches.

2.3.3.2. Do not use fine or coarse aggregates that contain substances that cause spalling.

2.3.3.3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

2.3.4. Water: Potable.

2.4. **ADMIXTURES:**

2.4.1. Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

2.4.2. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

2.4.3. Products: Subject to compliance with requirements, provide one of the following:

2.4.3.1. Air-Entraining Admixture:

2.4.3.1.1. Air-Tite or Amex 210; Cormix Construction Chemicals.

2.4.3.1.2. Air-Mix or Perma-Air; Euclid Chemical Co.

2.4.3.1.3. Darex AEA or Daravair; W.R. Grace & Co.

2.4.3.1.4. MB-VR or Micro-Air; Master Builders, Inc.

2.4.3.1.5. Sealtight AEA; W.R. Meadows, Inc.

2.4.3.1.6. Sika AER; Sika Corp.

2.5. **CURING MATERIALS:**

2.5.1. Clear Solvent-Borne Liquid Membrane-Forming Curing Compound: ASTM C 309, Type I, Class A or B, wax free.

2.5.2. Products: Subject to compliance with requirements, provide one of the following:

2.5.2.1. Clear Solvent-Borne Liquid Membrane-Forming Curing Compound:

2.5.2.1.1. Clear Cure; Anti-Hydro Co., Inc.

2.5.2.1.2. Spartan-Cote; The Burke Co.

2.5.2.1.3. All Resin; Conspec Marketing & Mfg. Co.

2.5.2.1.4. Sealco 309; Cormix Construction Chemicals.

2.5.2.1.5. Day-Chem Cure and Seal; Dayton Superior Corp.

2.5.2.1.6. Diamond Clear; Euclid Chemical Co.

2.5.2.1.7. #64 Resin Cure-Clear; Lambert Corp.

2.5.2.1.8. L&M Cure R; L&M Construction Chemicals, Inc.

2.5.2.1.9. Masterkure; Master Builders, Inc.

2.5.2.1.10. 3100 Series; W.R. Meadows, Inc.

2.5.2.1.11. Seal N Kure; Metalcrete Industries.

2.5.2.1.12. Kure-N-Seal; Sonneborn-Chemrex.

2.5.2.1.13. Horn Clear Seal; Tamms/A.C. Horn.

2.6. **CONCRETE MIX:**

2.6.1. Prepare design mixes for each type and strength of normal- weight concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use a qualified independent testing agency for preparing and reporting proposed mix designs.

2.6.1.1. Do not use the Owner's field quality-control testing agency as the independent testing agency.

2.6.2. Proportion mixes according to ACI 211.1 and ACI 301 to provide normal-weight concrete with the following properties:

2.6.2.1. Compressive Strength (28-Day): per 2.3.1.

2.6.2.2. Maximum Water-Cement Ratio at Point of Placement: 0.50.

2.6.2.3. Slump Limit at Point of Placement: 3 inches.

2.6.3. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows with a tolerance of plus or minus 1- 1/2 percent:

2.6.3.1. Air Content: 6.0 percent for 1-inch maximum aggregate.

2.6.4. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.7. **CONCRETE MIXING:**

2.7.1. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.

2.7.1.1. When air temperature is between 85 deg F 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. **SURFACE PREPARATION:**

3.1.1. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.1.2. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2. **EDGE FORMS AND SCREED CONSTRUCTION:**

3.2.1. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

3.2.2. Check completed formwork and screeds for grade and alignment to following tolerances:

3.2.2.1. Top of Forms: Not more than 1/8 inch in 10 feet.

3.2.2.2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.

3.2.3. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.3. **PLACING REINFORCEMENT:**

3.3.1. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.

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

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

3.3.4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.3.5. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.4. **JOINTS:**

3.4.1. General: Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise.

3.4.2. Contraction Joints: Provide weakened-plane contraction joints, sectioning concrete into areas as shown on Drawings. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, as follows:

3.4.2.1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.

3.4.2.2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into hardened concrete when cutting action will not tear, abrade, or otherwise damage surface and before development of random contraction cracks.

3.4.3. Construction Joints: Set construction joints at side and end terminations where placement operations are stopped for more than 1/2 hour, unless placement terminates at isolation joints with a maximum of 12-feet unless indicated otherwise.

3.4.3.1. Continue reinforcement across construction joints unless indicated otherwise. Do not continue reinforcement through sides of strip paving unless indicated.

3.4.4. Expansion Joints: Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

3.4.4.1. Locate expansion joints at intervals of 50 feet, unless indicated otherwise.

3.4.4.2. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.

3.4.4.3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

3.4.4.4. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

3.5. **CONCRETE PLACEMENT:**

3.5.1. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

3.5.2. Remove snow, ice, or frost from subbase surface and reinforcing before placing concrete. Do not place concrete on surfaces that are frozen.

3.5.3. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

3.5.4. Comply with requirements and with ACI 304R for measuring, mixing, transporting, and placing concrete.

3.5.5. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

3.5.5.1. When concrete placing is interrupted for more than 1/2 hour, place a construction joint.

3.5.6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.5.7. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete complying with ACI 309R.

3.5.7.1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcing, dowels, and joint devices.

3.5.8. Screed surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.

3.5.9. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

3.5.9.1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Architect.

3.5.10. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.

3.5.11. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

3.5.12. Cold-Weather Placement: Comply with provisions of ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

3.5.12.1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

3.5.12.2. Do not use frozen materials or materials containing ice or snow.

3.5.12.3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

3.5.13. Hot-Weather Placement: Place concrete complying with ACI 305R and as specified when hot weather conditions exist.

3.5.13.1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. Mixing water may be chilled 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.

3.5.13.2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3.5.13.3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6. CONCRETE FINISHING:

3.6.1. Float Finish: Begin floating when bleed water sheen has disappeared, and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/4 inch in 10 feet as determined by a 10-foot-long straightedge placed anywhere on the surface in any direction. Cut down high spots and fill low spots. Refloat surface immediately to a uniform granular texture.

3.6.1.1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across concrete surface perpendicular to line of traffic to provide a uniform fine line texture finish.

3.6.2. Final Tooling: Tool edges of paving, gutters, curbs, and joints formed in fresh concrete with a jointing tool to the following radius. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.7. CONCRETE PROTECTION AND CURING:

3.7.1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 306R for cold weather protection and ACI 305R for hot weather protection during curing.

3.7.2. Evaporation Control: In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screening and bull floating, but before floating.

3.7.3. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

3.7.4. Curing Methods: Cure concrete by moisture curing, moisture- retaining-cover curing, curing compound, or a combination of these as follows:

3.7.4.1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8. **FIELD QUALITY CONTROL TESTING:**

3.8.1. Qualified testing and inspection agecy retained by Owner will sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include the following:

3.8.1.1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

3.8.1.1.1 Slump: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.

3.8.1.1.2 Air Content: ASTM C 231, pressure method; one test for each compressive-strength test but no less than one test for each day's pour of each type of air- entrained concrete.

3.8.1.1.3 Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

3.8.1.1.4 Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive- strength test, unless directed otherwise. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

3.8.1.1.5 Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. Test one specimen at 7 days, test two specimens at 28 days, and retain one specimen in reserve for later testing if required.

3.8.1.2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

3.8.1.3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

3.8.1.4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

3.8.2. Test results will be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in paving, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.

3.8.3. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

3.8.4. Additional Tests: The testing agency will make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.9. **REPAIRS AND PROTECTION:**

3.9.1. Remove and replace concrete paving that is broken, damaged, or defective, or does not meet the requirements of this Section.

3.9.2. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to paving with epoxy adhesive.

3.9.3. Protect concrete from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

3.9.4. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.

END OF SECTION 02520

SECTION 02630 - STORM DRAINAGE

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1 This Section includes gravity-flow, nonpressure storm drainage outside the building, with the following components:

1.2.1.1 Special fittings for expansion and deflection.

1.2.1.2 Cleanouts.

1.2.1.3 Precast concrete manholes.

1.3 **DEFINITIONS**

1.3.1 RCP: Reinforced concrete pipe.

1.4 **PERFORMANCE REQUIREMENTS**

1.4.1 Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pipe joints shall be at least silt tight, unless otherwise indicated.

1.5 **SUBMITTALS**

1.5.1 Product Data: For the following:

1.5.1.1 Special pipe fittings.

1.5.1.2 Drains.

1.5.2 Shop Drawings: For the following:

1.5.2.1 Manholes: Include plans, elevations, sections, details, and frames and covers. Include design calculations, and concrete design-mix report for cast-in-place manholes.

1.5.2.2 Catch Basins and Stormwater Inlets. Include plans, elevations, sections, details, and frames, covers, and grates.

1.5.3 Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

1.5.4 Profile Drawings: Show profiles at horizontal scale of not less than 1-inch equals 50 feet and vertical scale of not less than 1-inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.

1.5.5 Field quality-control test reports.

1.6 **DELIVERY, STORAGE, AND HANDLING**

1.6.1 Protect pipe, pipe fittings, and seals from dirt and damage.

1.6.2 Handle manholes according to manufacturer's written rigging instructions.

1.6.3 Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

1.7 **PROJECT CONDITIONS**

1.7.1 Interruption of Existing Storm Drainage Service: Do not interrupt service to adjacent properties unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1.7.1.1 Notify Architect no fewer than thirty (30) days in advance of proposed interruption of service.

1.7.1.2 Do not proceed with interruption of service without Architect's and adjacent property owner’s written permission.

1.7.1.3 Due consideration shall be given to potential inclement weather before rerouting the existing drainage at the E. Thompson & US Highway 17 intersection. Initiate coordination through Architect at a minimum of thirty (30) days before start of storm drainage work. Coordinate with NCDOT and City of Jacksonville prior to rerouting drainage and construction the new traffic rated junction box.

PART 2 – PRODUCTS

2.1 **MANUFACTURERS**

2.1.1 In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

2.1.2 Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 **PIPING MATERIALS**

2.2.1 Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.

2.3 **CONCRETE PIPE AND FITTINGS**

2.3.1 Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, with bell-and-spigot ends and gasketed joints with ASTM C 443, rubber gaskets.

2.3.1.1 Class II, Wall B.

2.4 **NONPRESSURE-TYPE PIPE COUPLINGS**

2.4.1 Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.4.2 Sleeve Materials:

2.4.2.1 For Concrete Pipes: ASTM C 443, rubber.

2.5 **MANHOLES**

2.5.1 Designed Precast Concrete Manholes: ASTM C 913; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.

2.5.1.1 Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole, as required to prevent flotation.

2.5.1.2 Joint Sealant: ASTM C 990, bitumen or butyl rubber.

2.5.1.3 Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.

2.5.1.4 Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.

2.5.1.5 Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.

2.5.1.6 Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Design based on City's MSSD. Details are on the City's website: https://www.jacksonvillenc.gov/DocumentCenter/Veiw/6197/Storm-Drain-Details-631-01_639-01, page #9.

2.5.1.6.1 Material: ASTM A 536, Grade 60-40-18 ductile iron, unless otherwise indicated.

2.6 CONCRETE

2.6.1 General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:

2.6.1.1 Cement: ASTM C 150, Type II.

2.6.1.2 Fine Aggregate: ASTM C 33, sand.

2.6.1.3 Coarse Aggregate: ASTM C 33, crushed gravel.

2.6.1.4 Water: Potable.

2.6.2 Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious materials ratio.

2.6.2.1 Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.

2.6.2.2 Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

2.7 CATCH BASINS

2.7.1 Designed Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.

2.7.1.1 Joint Sealants: ASTM C 990, bitumen or butyl rubber.

2.7.1.2 Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.

2.7.1.3 Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.

2.7.1.4 Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.

2.7.1.5 Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

2.7.2 Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter flat grate with small square or short-slotted drainage openings.

2.7.2.1 Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.8 STORMWATER INLETS

2.8.1 Curb Inlets: Made with vertical curb opening, of materials and dimensions according to utility standards.

2.8.2 Frames and Grates: Heavy-duty frames and grates according to utility standards.

2.9 MISCELLANEOUS STORMWATER STRUCTURES

2.9.1 Check Dams: Broken, irregular size and shape, graded stone according to NSSGA's "Quarried Stone for Erosion and Sediment Control."

2.9.2 Filter Stone: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. FS-2, No. 4 screen opening, average-size, graded stone.

2.9.3 Energy Dissipaters: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. A-1, 3-ton average weight armor stone, unless otherwise indicated.

PART 3 – EXECUTION

3.1 EARTHWORK

3.1.1 Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 PIPING APPLICATIONS

3.2.1 Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

3.2.1.1 Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.

3.2.1.1.1 Unshielded flexible or rigid couplings for same or minor difference OD pipes.

3.2.1.1.2 Unshielded, increaser/reducer-pattern, flexible or rigid couplings for pipes with different OD.

3.2.1.1.3 Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.2.1.2 Use pressure-type pipe couplings for force-main joints.

3.2.2 Special Pipe Fittings: Use for pipe expansion and deflection. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

3.2.3 Gravity-Flow, Nonpressure Storm Water Piping: Use the following pipe materials for each size range:

3.2.3.1 NPS 42 to NPS 60: Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.

3.3 PIPING INSTALLATION

3.3.1 General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

3.3.2 Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

3.3.3 Install manholes for changes in direction unless fittings are indicated. Use 3.3.3 fittings for branch connections unless direct tap into existing sewer is indicated.

3.3.4 Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

3.3.5 Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

3.3.6 Install gravity-flow, nonpressure drainage piping according to the following:

3.3.6.1 Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.

3.3.6.2 Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.

3.3.6.3 Install piping with as indicated minimum cover.

3.3.6.4 Install piping below frost line.

3.3.6.5 Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.4 PIPE JOINT CONSTRUCTION

3.4.1 Basic pipe joint construction is specified in Division 2 Section "Piped Utilities - Basic Materials and Methods." Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

3.4.2 Join gravity-flow, nonpressure drainage piping according to the following:

3.4.2.1 Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.

3.5 MANHOLE INSTALLATION

3.5.1 General: Install manholes, complete with appurtenances and accessories indicated.

3.5.2 Install precast concrete manhole sections according to ASTM C 891.

3.5.3 Construct cast-in-place manholes as indicated.

3.5.4 Install PE sheeting on earth where cast-in-place-concrete manholes are to be built.

3.5.5 Install FRP manholes according to manufacturer's written instructions.

3.5.6 Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.

3.6 CATCH BASIN INSTALLATION

3.6.1 Construct catch basins to sizes and shapes indicated.

3.6.2 Set frames and grates to elevations indicated.

3.6.3 Construct riprap of broken stone, as indicated.

3.7 CONCRETE PLACEMENT

3.7.1 Place cast-in-place concrete according to ACI 318/318R.

3.8 DRAINAGE SYSTEM INSTALLATION

3.8.1 Assemble and install components according to manufacturer's written instructions.

3.8.2 Install with top surfaces of components, except piping, flush with finished surface.

3.8.3 Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.

3.8.4 Embed channel sections and drainage specialties in 4-inch minimum concrete around bottom and sides.

3.8.5 Fasten grates to channel sections if indicated.

3.8.6 Assemble channel sections with flanged or interlocking joints.

3.8.7 Embed channel sections in 4-inch minimum concrete around bottom and sides.

3.9 **CONNECTIONS**

3.9.1 Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 2 Section "Storm Drainage."

3.10 **FIELD QUALITY CONTROL**

3.10.1 Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

3.10.1.1 Submit separate tests for each system inspection.

3.10.1.2 Defects requiring correction include the following:

3.10.1.2.1 Alignment: Less than full diameter of inside of pipe is visible between structures.

3.10.1.2.2 Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.

3.10.1.2.3 Crushed, broken, cracked, or otherwise damaged piping.

3.10.1.2.4 Infiltration: Water leakage into piping.

3.10.1.2.5 Exfiltration: Water leakage from or around piping.

3.10.1.3 Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

3.10.1.4 Reinspect and repeat procedure until results are satisfactory.

3.10.2 Owner/City to perform testing of new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

3.10.2.1 Do not enclose, cover, or put into service before inspection and approval.

3.10.2.2 Test completed piping systems according to authorities having jurisdiction.

3.10.2.3 Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

3.10.2.4 Submit separate report for each test.

3.10.2.5 Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

3.10.2.5.1 Exception: Piping with soil tight joints unless required by authorities having jurisdiction.

3.10.2.5.2 Option: Test plastic piping according to ASTM F 1417.

3.10.2.5.3 Option: Test concrete piping according to ASTM C 924.

3.10.3 Leaks and loss in test pressure constitute defects that must be repaired.

3.10.4 Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

3.11.1 Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 02630

SECTION 02666 - POTABLE WATER SYSTEMS

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS:**

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 **DESCRIPTION OF WORK:**

1.2.1 Extent of potable water systems is indicated on drawings and schedules, and by requirements of this section.

1.2.2 Refer to Division-2 section "Earthwork" for excavation and backfill required for potable water systems.

1.2.4 Refer to Division-15 for interior building systems including interior piping, fixtures, and equipment; not work of this section.

1.3 **QUALITY ASSURANCE:**

1.3.1 Manufacturer's Qualifications: Firms regularly engaged in manufacturer of potable water systems materials and products, of types and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.

1.3.2 Installer's Qualifications: Licensed Utility Contractor with at least three (3) years of successful installation experience on projects with potable water piping work similar to that required for project.

1.3.3 Plumbing Code Compliance: Comply with applicable portions of North Carolina Building Code - Volume II, Plumbing pertaining to selection and installation of potable water system materials and products.

1.3.4 Local Utility Compliance: Comply with requirements of the City of Jacksonville regarding supplying water to project, and for metering information; obtain all required permits and inspections.

1.4 **SUBMITTALS:**

1.4.1 Record Drawings: At project closeout, submit record drawings of installed potable water system piping and products, in accordance with requirements of Division 1.

1.4.2 Maintenance Data: Submit maintenance data and parts lists for potable water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.1 **IDENTIFICATION:**

2.1.1 Underground -Type Plastic Line Markers: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mil thick. Provide blue tape with black printing reading "CAUTION WATER LINE BURIED BELOW".

2.1.1.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering plastic line markers which many be incorporated in the work include, the following or other manufacturer approved by Owner and Architect/Engineer.

Allen System Inc.
Seton Name Plate Corp.

2.2 **PIPES AND PIPE FITTINGS:**

2.2.1 General: Provide piping materials and factory-fabricated piping products of sizes, type, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with AWWA Standards where applicable. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in interior water piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.2.2 Piping: Provide pipe of the following material, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

2.2.2.1 Copper Tube: ASTM B 88; Type K, soft-annealed temper.

2.2.2.1.1 Fittings: Wrought-copper solder-joint fittings, ANSI B16.22; silver soldered joints.

2.3 **VALVES:**

2.3.1 Gate Valves: Provide as indicated, gate valves AWWA C500, 175 psi working pressure. Provide threaded, flanged, hub, or other end configurations to suit size of valve and piping connection. Provide inside screw type for use with curb valve box, iron body, bronze-mounted, double disc, parallel seat, non-rising stem.

2.3.1.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering gate valves which may be incorporated in the work include the following or other manufacturer approved by Owner and Architect / Engineer.

Clow Corp; Valve Div.
Dresser Mfg.; Div. of Dress Industries.
Fairbanks Co.
Kennedy Valve; Div. of ITT Grinnel Valve Co., Inc.
Stockham Valves and Fittings Inc.
Waterous Co.

2.3.2 **WATER METER/BACKFLOW:**

2.3.2.1 Water meter to be obtained from local water utility. Provide standard below grade meter box/vault along with backflow device in an above ground fiberglass enclosure in accordance with water department standard details and utility plan.

2.4 **ACCESSORIES:**

2.4.1 Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends and valves. All anchorage materials shall be stainless steel.

PART 3 - EXECUTION

3.1 **INSPECTION:**

3.1.1 General: Examine areas and conditions under which potable water system's materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Architect.

3.2 **INSTALLATION OF IDENTIFICATION:**

3.2.1 General: During back-filling/topsoiling of underground potable water piping, install continuous underground type plastic line markers, located directly over buried lines at 6" to 8" below finished grade.

3.3 **INSTALLATION OF PIPE AND PIPE FITTINGS:**

3.3.1 Copper Tube: Install in accordance with CDA "Copper Tube Handbook".

3.3.2 Depth of Cover: Provide minimum cover over piping of 12" below average local frost depth or 48" below finished grade, whichever is greater.

3.3.3 Water Service Termination: Terminate potable water piping as indicated. Provide temporary pipe plug for piping extensions into building, by work of Division 15.

3.3.4 Water service connection to utility system shall be in accordance with the City of Jacksonville's MSSD.

3.4 **INSTALLATION OF VALVES:**

3.4.1 General: Install valves as indicated with stems pointing up. Provide valve box over underground valves.

3.5 **FIELD QUALITY CONTROL:**

3.5.1 Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline 24-hrs prior to testing and apply test pressure to stabilize system. Use only potable water.

3.5.2 Hydrostatic Tests: Test at not less than 150 psi for 2-hrs.

3.5.2.1 Test fails if leakage exceeds zero (0) psi lost.

3.5.2.2 Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for two hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

3.6 **ADJUSTING AND CLEANING:**

3.6.1 Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C601, "Standard for Disinfecting Water Mains", to the satisfaction of local authorities having jurisdiction.

END OF SECTION 02666

SECTION 02668 - FIRE WATER PIPING SYSTEMS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1 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:**

1.2.1 Extent of fire water service piping is indicated on drawings and schedules, and by requirements of this section.

1.2.2 Refer to Division-2 section "Earthwork" for excavation and backfill required for fire water systems.

1.3 **QUALITY ASSURANCE:**

1.3.1 Manufacturer's Qualifications: Firms regularly engaged in manufacturer of fire water system's products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.3.2 Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with fire water work similar to that required for project.

1.3.3 Codes and Standards:

1.3.3.1 NFPA Compliance: Install fire water systems in accordance with NFPA 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances".

1.3.3.2 Local Fire Department/Marshal Regulations: Comply with governing regulations pertaining to hydrants, including hose unit threading and similar matching connections.

1.3.3.3 UL Compliance: Provide fire hydrants that comply with UL 246 "Hydrants for Fire-Protection Service" and are listed by UL and approved for use by local Fire Department.

1.4 **SUBMITTALS:**

1.4.1 Product Data: Submit manufacturer's technical product data and installation instructions for fire water system materials and products.

1.4.2 Shop Drawings: Submit shop drawings for fire water systems, showing piping materials, size, locations, and elevations. Include details of underground structures, connections, thrust blocks, and anchors. Show interface and spatial relationship between piping and proximate structures.

1.4.3 Record Drawings: Submit shop drawings for fire water systems, showing piping materials, size, locations, and elevations. Include details of underground structures, connections, thrust blocks, and anchors. Show interface and spatial relationship between piping and proximate structures.

1.4.3 Record Drawings: At project closeout, submit record drawings of installed fire water system piping and products, in accordance with requirements of Division 1.

1.4.4 Maintenance Data: Submit maintenance data and parts lists for fire water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.1 **IDENTIFICATION:**

2.1.1 Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 5" wide x 4 mils thick. Provide blue tape with black printing reading "CAUTION WATER LINE BURIED BELOW".

2.1.1.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering identification markers which may be incorporated in the work include the following or other manufacturer approved by Owner and Architect/Engineer.

Allen Systems, Inc.
Seton Name Plate Corp.

2.2 **PIPES AND PIPE FITTINGS:**

2.2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with NFPA 24 where applicable. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in interior fire water piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.2.2 Piping: Provide pipe of the following material, of weight/class indicated. Provide piping fittings and accessories of same materials and weight/class as pipes, with joining method as indicated.

2.2.3 Steel Pipe: AWWA C200 with cement-mortar lining conforming to AWWA C205; and coal-tar enamel protective coating, AWWA C203.

2.2.3.1 Fittings: Steel water pipe fittings, AWWA C208, welded joints, AWWA C206.

2.2.3.2 Push-on and mechanical joint pipe shall be as manufactured by the American Cast Pipe Company, United States Pipe and Foundry Company, Griffin Pipe Products, McWane Cast Iron Pipe Company.

2.2.3.3 Restrained joints shall be TR Flex or Lok Tyte as manufactured by U.S. Pipe, Lok-Fast or Lok-Ring as manufactured by American Pipe or Super-Lock as manufactured by Clow.

2.3 **PIPING SPECIALTIES:**

2.3.1 Service connection shall be made to the existing water utility piping via tapping saddles approved by local water utility.

2.3.1.1 Tapping sleeves shall be Meuller mechanical joint Meuller Outlet Seal, American Uniseal or Kennedy Square Seal. All sleeves shall have a minimum of 150 psi working pressure. All sleeves larger than twelve (12) inches shall be ductile iron. All taps shall be machine drilled-no burned taps will be allowed.

2.4 **VALVES:**

2.4.1 Gate Valves: Provide gate valves, UL-listed, 175 psi working pressure for 12" and smaller, 150 psi for sizes larger than 12". Provide threaded, flanged, hub, or other end configurations to suit size of valve and piping connection. Provide inside screw type for use with indicator post, iron body bronze mounted, non-rising stem, solid wedge disc.

2.4.1.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering gate valves which may be incorporated in the work include, but the following or other manufacturer approved by Owner and Architect/Engineer.

American Valve Mfg. Corp.
American-Darling Valve; Div. of American Cast Iron Pipe Clow Corp.; Valve Div.
Fairbanks Co.
Kennedy Valve; Div. of ITT Grinnel Valve Co. Inc.
Stockham Valves & Fittings Inc.
United Brass Works, Inc.
United States Pipe and Foundry Co.
Waterous Co.

2.5 **FIRE HYDRANTS:**

2.5.1 Fire hydrants shall comply with AWWA C502-80 as manufactured by Kennedy Guardian, Mueller A421 Centurion or American. The Centurion shall include a center punch mark on the lower stem for identification and inclusion of a vertical shoe for a 5-1/4 inch valve opening. Nozzles shall have standard threads and shall consist of the following: Two- and one-half-inch nozzles, and 1 four-inch nozzle. All nozzles shall be provided with cap and cap retaining chain. The hydrant valve opening shall be four and one-half inches.

2.6 **ACCESSORIES:**

2.6.1 Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.

2.6.1.1 Clamps, Straps, and Washers: Steel, ASTM A 506.

2.6.1.2 Rods: Steel, ASTM A 575.

2.6.1.3 Rod Couplings: Malleable-iron, ASTM A 197.

2.6.1.4 Bolts: Steel, ASTM A 307.

2.6.1.5 Cast-Iron Washers: Gray-iron, ASTM A 126.

2.6.1.6 Thrust Blocks: Concrete, 2,500 psi.

PART 3 - EXECUTION

3.1 **INSTALLATION OF IDENTIFICATION:**

3.1.1 General: During back-filling/top-soiling of underground fire water piping systems, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished grade.

3.2 **INSTALLATION OF PIPE AND PIPE FITTINGS:**

3.2.1 Ductile-Iron Pipe: Install in accordance with AWWA C600 "Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances".

3.2.2 Steel Pipe: Install in accordance with AWWA M11 "Steel Pipe - Design and Installation".

3.2.3 Depth of Cover: Provide minimum depth of cover over underground piping in accordance with NFPA 24, Figure A-8.1.1 "Recommended Depth of Cover Above Top of Underground Yard" but is no case shall the depth be less than 3'-0" for Ductile Pipe and Steel pipe.

3.3 **INSTALLATION OF VALVES:**

3.3.1 General: Install valves as indicated. Provide post indicator for control valves.

3.3.2 Shutoff Valve: Install shutoff valve ahead of each hydrant.

3.4 **SETTING HYDRANTS:**

3.4.1 Specific directions are required for the setting of all hydrants. In areas where paving is not anticipated in the near future, hydrants shall be set according to the inspector's directions. In general, hydrants shall be located in a manner to provide complete accessibility and minimize possibility of damage from vehicles or injury to pedestrians.

3.4.2 Hydrant installation shall be in accordance with local fire department standard details and will be rodded the entire length from main to hydrant.

3.4.3 Before a hydrant is set, all dirt and foreign matter shall be removed from the interior of the hydrant.

3.4.4 All fittings or components subject to hydrostatic thrust shall be securely anchored by the use of concrete thrust blocks poured in place, unless otherwise directed by the engineer. The reaction areas required for these thrust blocks shall be given to the contractor by the inspector, and the contractor shall install the blocks according to directions provided by the inspector. Where concrete must be reinforced, the contactor shall furnish such reinforcing as is required. The contractor shall furnish all reaction blocking and reinforcement at no additional cost.

3.5 **FIELD QUALITY CONTROL:**

3.5.1 Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline with water 24-hrs. prior to testing and apply test pressure to stabilize system.

3.5.2 Hydrostatic Tests: Test at not less than 200 psi for 2-hrs, or at 50 psi above maximum static pressure if it is greater than 150 psi.

3.5.2.1 Test fails if leakage exceeds 2-qts, per hour per 100 gaskets or joints irrespective of pipe diameter.

3.5.2.2 Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hours, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

3.5.3 Operating Tests: Open and close all valves and hydrants under system, water pressure checking dry barrel hydrants for proper drainage.

3.6 **ADJUSTING AND CLEANING:**

3.6.1 Flushing: Flush underground mains and lead-in connections to sprinkler risers before connection is made to sprinklers, standpipes, or other fire protection system piping.

3.6.1.1 Flush at flow rate not less than that indicated in NFPA 24, or at hydraulically calculated water demand rate of the system, whichever is greater.

END OF SECTION 02668

SECTION 02700 – SEWERAGE AND DRAINAGE

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

1.1.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and City of Jacksonville MSSD Specification Sections, apply to this Section.

1.2. **SUMMARY:**

1.2.1. This Section includes sewerage and drainage systems outside the building. Systems include the following:

1.2.1.1. Sanitary sewerage.

1.2.2. Related Sections: The following Sections contain requirements that relate to this section.

1.2.2.2. Division 3 Section “Cast-in-Place Concrete” for the cast-in-place concrete structures.

1.2.2.3. Division 15 Section “Sanitary Piping System” for building sewerage.

1.3. **DEFINITIONS:**

1.3.1. Drainage Piping: System of sewer pipe, fittings, and appurtenances for gravity flow of storm drainage.

1.3.2. Sewerage Piping: System of sewer pipe, fittings, and appurtenances for gravity flow of sanitary sewage.

1.4. **PERFORMANCE REQUIREMENTS:**

1.4.1. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

1.5. **SUBMITTALS:**

1.5.1. General: Submit each item in this Article according to the Conditions of the Contract and City of Jacksonville MSSD Specification Sections.

1.5.2 Record Drawings: At project closeout, submit record drawings of installed potable water system piping and products, in accordance with requirements of City of Jacksonville MSSD Specification Sections.

1.5.3. Product data for the following:

1.5.3.1. Backwater valves, cleanouts, and drains.

1.5.4. Inspection and test reports specified in the “Field Quality Control” Article.

1.6. **QUALITY ASSURANCE:**

1.6.1. Environmental Agency Compliance: Comply with regulations pertaining to sanitary sewage and storm drainage systems.

1.6.2. Utility Compliance: Comply with regulations pertaining to sanitary sewerage and storm drainage systems. Include standards for connection to utility system as required by the City of Jacksonville.

1.6.3. Product Options: Drawings indicate sizes, profiles, connections, and dimensional requirements of system components and are based on specific manufacturer types indicated. Other manufacturers’ products with equal performance characteristics may be considered. Refer to Division 1 Section “Product Substitutions.”

1.7. **DELIVERY, STORAGE, AND HANDLING:**

1.7.1. Protect pipe, pipe fittings and seals from dirt and damage.

1.7.2. Handle valves, taps, cleanouts and other structures according to manufacturer’s rigging instructions.

1.8. **PROJECT CONDITIONS:**

1.8.1. Site Information: Refer to site grading/drainage plan for underground piping locations.

1.8.2. Existing Utilities: Coordinate connection to existing utilities serving facilities being constructed by other arrange to provide acceptable temporary utility services (if required).

1.8.2.1. Notify Owner not less than 48 hours in advance of proposed tie-in to existing utilities.

1.9. **SEQUENCING AND SCHEDULING:**

1.9.1. Coordinate sanitary sewerage system connection to local municipality sewer system through Architect.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to the following:

2.2. **PIPES AND FITTINGS:**

2.2.1. PVC Pipe – ASTM D-3034, SDR35.

2.2.2. Reinforced Concrete Piping: ASTM C76, Class III unless otherwise indicated.

2.2.2.1. Fittings: Reinforced concrete, same strength as adjoining pipe, tongue-and-groove gaskets joints complying with ASTM C 443.

2.3. **CLEANOUTS:**

2.3.1. Description: ASME A112.36.2M, round cast-iron housing with clamping device and round, secured, scoriated, cast-iron cover. Include cast-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass or bronze closure plug. Use units with top-loading classification according to the following applications:

2.3.1.1. Light Duty: In earth or grass, foot-traffic areas.

Medium Duty: In paved, foot-traffic areas.

Heavy Duty: In vehicle-traffic service areas.

Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, service class, cast-iron soil pipe and fittings.

PART 3 - EXECUTION

3.1. **EARTHWORK:**

3.1.1. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork" and City of Jacksonville MSSD specification sections.

3.2. **IDENTIFICATION:**

3.2.1. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installation of green warning tapes directly over piping and at outside edges of underground structures.

3.2.1.1. Use warning tapes or detectable warning tape over ferrous piping.

3.2.1.2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.3. **SEWERAGE PIPING APPLICATIONS:**

3.3.1. General: Include watertight joints.

3.3.2. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products lists below. Use pipe, fittings and joining methods according to the following applications with gasketed joints.

3.3.3. Pipe: In accordance with City of Jacksonville MSSD specification sections.

3.4. **DRAINAGE PIPING APPLICATIONS:**

3.4.1. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to the following applications.

3.4.2. Pipe: Reinforced-concrete sewer pipe and fittings; rubber gaskets; and gasketed joints.

3.5. **INSTALLATION GENERAL:**

3.5.1. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of underground sewerage and drainage systems piping. Location and arrangement of piping layout take into account many design considerations, coordinate with location of other underground utilities and install piping as indicated, to extent practical.

3.5.2. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity to invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's recommendations for use of lubricants, cements and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

3.5.3. Use manholes for changes in direction, except where fittings are indicated. Use fittings for branch connections, except where direct tap into existing sewer is indicated.

3.5.4. Use proper size increasers, reducers, and couplings, where different sizes or materials of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

3.5.5. Install gravity-flow-systems piping at constant slope between points and elevations indicated. Install straight piping runs at constant slope, not less than that specified, where slope is not indicated.

3.5.6. Extend sewerage piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.

3.6. **PIPE JOINT CONSTRUCTION AND INSTALLATION:**

3.6.1. General: Join and install ductile iron and/or PVC pipe and fittings according to the pipe manufacturer's written instructions.

3.6.2. Concrete Pipe and Fittings: Install according to ACPA "Concrete Pipe Handbook." Use the following seals:

3.6.2.1. Round Pipe and Fittings: ASTM C 443 rubber gaskets.

3.7. **CLEANOUT INSTALLATION:**

3.7.1. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

3.7.2. Set cleanout frames and covers in earth in a cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.

3.7.3. Set cleanout frames and covers in concrete paving with tops flush with surface of paving.

3.8. **FIELD QUALITY CONTROL:**

3.8.1. Clear interior of piping and structures of dirt and superfluous material as the work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

3.8.1.1. In large, accessible piping, brushes and brooms may be used for cleaning.

3.8.1.2. Place plug in end of incomplete piping at end of day and whenever work stops.

3.8.1.3. Flush piping between manholes and other structures, if required by authorities having jurisdiction, to remove collected debris.

3.8.2. Provide camera inspection of interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of the project.

3.8.2.1. Defects requiring correction include the following:

3.8.2.1.1. Alignment: Less than full diameter if inside of pipe is visual between structures.

3.8.2.1.2. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5 percent of piping diameter.

3.8.2.1.3. Crushed, broken, cracked, or otherwise damage piping.

3.8.2.1.4. Infiltration: Water leakage into piping.

3.8.2.1.5. Exfiltration: Water leakage from or around piping.

3.8.2.2. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.

3.8.2.3. Reinspect and repeat procedure until results are satisfactory.

3.8.3. Test new piping systems and parts of existing systems that have been altered, extended, or repaired for leaks and defects.

3.8.3.1. Do not enclose, cover, or put into service before inspection and approval.

3.8.3.2. Test completed piping systems according to authorities having jurisdiction along with field camera of lines in presence of Owner representative.

3.8.3.3. Schedule tests, and their inspections by authorities having jurisdiction, with Architect at least 24 hours advance notice.

END OF SECTION 02700

SECTION 02900 - LANDSCAPING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes the following:

1.2.1.1. Trees.

1.2.1.2. Shrubs.

1.2.1.3. Ground covers.

1.2.1.4. Plants.

1.2.1.5. Lawns.

1.2.1.6. Topsoil and soil amendments.

1.2.1.7. Fertilizers and mulches.

1.2.1.8. Stakes and guys.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 2 Section "Site Clearing" for protection of existing trees and planting, topsoil stripping and stockpiling, and site clearing.

1.2.2.2. Division 2 Section "Earthwork" for excavation, filling, rough grading, and subsurface aggregate drainage and drainage backfill.

1.3. **SUBMITTALS:**

1.3.1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2. Product certificates signed by manufacturers certifying that their products comply with specified requirements.

1.3.2.1. Manufacturer's certified analysis for standard products.

1.3.2.2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

1.3.2.3. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.

1.3.3. Certification of grass seed from seed vendor for each grass- seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1.3.4. Samples of each of the following:

1.3.4.1. 5 lb of mineral mulch for each color and texture of stone required for Project, in labeled plastic bags.

1.3.4.2. Edging materials and accessories to verify color selected.

1.3.5. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of architects and owners, and other information specified.

1.3.6. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.

1.3.6.1. Certification of imported topsoil.

1.3.7. Planting schedule indicating anticipated dates and locations for each type of planting.

1.4. **QUALITY ASSURANCE:**

1.4.1. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.

1.4.1.1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

1.4.2. Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock" and the American Association of Nurserymen.

1.4.2.1. Selection of exterior plants will be made by Architect, based on pictures provided by contractor indicating typical for each species to be provided. Pictures shall have plant identification, size, and be good enough quality to show condition.

1.4.3. Topsoil Certification: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant- nutrient content of topsoil.

1.4.3.1. Report suitability of topsoil for growth of applicable planting material.

1.4.4. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

1.4.5. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.4.5.1 Notify Owner or Owner Representative of sources of planting materials fourteen (14) days in advance of delivery to site.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

1.5.2. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.5.3. Sod: Harvest, deliver, store, and handle sod according to the requirements of the Turfgrass Producers International (TPI) "Specifications for turfgrass Sod Material and Transporting/Installing".

1.5.4. Trees and Shrubs: Deliver freshly dug trees and shrubs. Do not prune before delivery, except as approved by Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery.

1.5.5. Handle balled and burlapped stock by the root ball.

1.5.6. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.

1.5.6.1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.

1.5.6.2. Do not remove container-grown stock from containers before time of planting.

1.5.6.3. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.6. **PROJECT CONDITIONS:**

1.6.1. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

1.6.2. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.

1.7. **COORDINATION AND SCHEDULING:**

1.7.1. Coordinate installation of planting materials during normal planting seasons for each type of plant material required as indicated.

1.7.1.1 Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1.7.1.1.1 Trees: Sprint Planting: February 15th thru May 31st

1.7.1.1.2 Trees: Fall Planting: September 1st thru December 1st

1.7.1.1.3 Shrubs and groundcovers: Year-round, or as suggested by supplier based upon plant material type and warranty.

1.8. **WARRANTY:**

1.8.1. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

1.8.2. Special Warranty: Warrant the following living planting materials for a period of twelve months after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

1.8.2.1. Trees.

1.8.2.2. Shrubs.

1.8.2.3. Ground covers.

1.8.2.4. Plants.

1.8.3. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

1.8.4. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

1.8.5. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

PART 2 - PRODUCTS

2.1. **TREE AND SHRUB MATERIAL:**

2.1.1. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully- branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

2.1.2. Grade: Provide trees and shrubs of sizes and grades conforming to ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

2.1.3. Label at least 1 tree and 1 shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.

2.2. **SHADE AND FLOWERING TREES:**

2.2.1. Shade Trees: Single-stem trees with straight trunk, well- balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.

2.2.1.1. Branching Height: 1/3 to 1/2 of tree height.

2.2.2. Small Trees: Small upright or spreading type, branched or pruned naturally according to species and type, and with relationship of caliper, height, and branching recommended by ANSI Z60.1, and stem form as follows:

2.2.2.1. Form: Single stem.

2.2.3. Provide balled and burlapped trees.

2.2.3.1. Container-grown trees will be acceptable in lieu of balled and burlapped trees subject to meeting ANSI Z60.1 limitations for container stock.

2.3. **DECIDUOUS SHRUBS:**

2.3.1. Form and Size: Deciduous shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.

2.3.2. Provide balled and burlapped deciduous shrubs.

2.3.2.1. Container-grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to meeting ANSI Z60.1 limitations for container stock.

2.4. **CONIFEROUS EVERGREENS:**

2.4.1. Form and Size: Normal-quality, well-balanced, coniferous evergreens, of type, height, spread, and shape required, conforming to ANSI Z60.1.

2.4.2. Form and Size: Specimen-quality, exceptionally heavy, tightly knit, symmetrically shaped coniferous evergreens of the following grade:

2.4.2.1. Heavy Grade: "X."

2.4.2.2. Heavy Grade: "XX."

2.4.2.3. Heavy Grade: "XXX."

2.4.3. Provide balled and burlapped coniferous evergreens.

2.4.3.1. Container-grown coniferous evergreens will be acceptable in lieu of balled and burlapped coniferous evergreens subject to meeting ANSI Z60.1 limitations for container stock.

2.5. **BROADLEAF EVERGREENS:**

2.5.1. Form and Size: Normal-quality, well-balanced, broadleaf evergreens, of type, height, spread, and shape required, conforming to ANSI Z60.1.

2.5.2. Provide balled and burlapped broadleaf evergreens.

2.5.2.1. Container-grown broadleaf evergreens will be acceptable in lieu of balled and burlapped broadleaf evergreens subject to meeting ANSI Z60.1 limitations for container stock.

2.6. **GROUND COVERS AND PLANTS:**

2.6.1. Provide ground covers and plants established and well rooted in removable containers or integral peat pots and with not less than the minimum number and length of runners required by ANSI Z60.1 for the pot size indicated.

2.7. **GRASS MATERIALS:**

2.7.1. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.

2.7.1.1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on Schedules at the end of this Section.

2.8. **SOD:**

2.8.1. Harvest, deliver, store and handle sod according to the requirements of the Turfgrass Producers International (TPI) "Specifications for Turfgrass Sod Material and Transporting/Installing".

2.8.2. Certified Turfgrass sod complying with ASPA specifications for machine cut thickness, size, strength, moisture content and mowed height, and free of weeds and undesirable native grasses. Provide sod of uniform density, color, texture of the following turfgrass spicies,strongly rooted, and capable of vigorous growth and development when planted.

2.8.3. Provide sod of centipede or a like variety of grass approved by the owner. Grass is to meet the proportions of weight, and minimum percentage of purity, germination, and maximum percentage of weed seed as indicated.

2.8.4. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.

2.8.5. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod stripes or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

2.8.6. Lay sod across angle of slopes exceeding 1:3. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

2.8.7. Saturate sod with fine water spray within 2 hours of planting. During the first week, water daily, or more frequently as necessary to maintain moist soil to a minimum depth of 1- 1/2 inches below the sod.

2.9. **TOPSOIL:**

2.9.1. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth.

2.9.1.1. Topsoil Source: Reuse surface soil stockpiled on the site or provide from approved off-site source when sufficient approved topsoil is not available on-site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.10. **SOIL AMENDMENTS:**

2.10.1. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.

2.10.1.1. Provide lime in the form of dolomitic limestone.

2.10.2. Aluminum Sulfate: Commercial grade, unadulterated.

2.10.3. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

2.10.4. Perlite: Horticultural perlite, soil amendment grade.

2.10.5. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

2.10.6. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

2.10.6.1. When site treated, mix with at least 0.15 lb of ammonium nitrate or 0.25 lb of ammonium sulfate per cu. ft. of loose sawdust or ground bark.

2.10.7. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.10.8. Herbicides: EPA registered and approved, of type recommended by manufacturer.

2.10.9. Water: Potable.

2.10.10. Compost: Leaf or comparable organic compost composed of yard waste.

2.11. **FERTILIZER:**

2.11.1. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

2.11.2. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

2.11.3. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:

2.11.3.1. Composition: 8-8-8 or similar combination.

2.12. **MULCHES:**

2.12.1. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

2.12.1.1. Type: Brown shredded hardwood mulch unless otherwise stated in plans (no substitution).

2.12.2. Asphalt Emulsion Tackifier: Asphalt emulsion, ASTM D 977, Grade SS-1, nontoxic and free of plant growth- or germination-inhibitors.

2.13. **EROSION-CONTROL MATERIALS:**

2.13.1. Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, 0.92 lb per sq. yd. minimum, with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

2.14. **STAKES AND GUYS:**

2.14.1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches by length indicated, pointed at one end.

2.14.2. Guys: Support trees with 2 nylon straps with a slip knot (see details). Allow enough slack to avoid rigid restraint of tree. ArborTie is acceptable.

2.15. **MISCELLANEOUS MATERIALS:**

2.15.1. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

2.15.2. Trunk-Wrap Tape: Two layers of crinkled paper cemented together with bituminous material, 4 inches wide minimum, with stretch factor of 33 percent.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **PREPARATION:**

3.2.1. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.3. **PLANTING SOIL PREPARATION:**

3.3.1. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

3.3.2. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

3.3.3. For tree pit or trench backfill, mix planting soil before backfilling and stockpile at site.

3.3.4. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

3.3.4.1. Mix lime with dry soil prior to mixing fertilizer. Prevent lime from contacting roots of acid-tolerant plants.

3.4. **LAWN PLANTING PREPARATION:**

3.4.1. Limit subgrade preparation to areas that will be planted in the immediate future.

3.4.2. Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous materials.

3.4.3. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.

3.4.3.1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

3.4.4. Preparation of Unchanged Grades: Where lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare soil as follows:

3.4.4.1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns.

3.4.4.2. Till surface soil to a depth of at least 6 inches. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.

3.4.4.3. Clean surface soil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

3.4.4.4. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the Owner's property.

3.4.5. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches in any dimension, and other objects that may interfere with planting or maintenance operations.

3.4.6. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.4.7. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.5. **GROUND COVER AND PLANT BED PREPARATION:**

3.5.1. Loosen subgrade of planting bed areas to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous materials.

3.5.2. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

3.5.3. Remove soil to a minimum depth of 8 inches and replace with prepared planting soil mixture.

3.6. **EXCAVATION FOR TREES AND SHRUBS:**

3.6.1. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.

3.6.1.1. Balled and Burlapped Trees and Shrubs: Excavate approximately 2 times as wide as ball diameter and equal to ball depth, plus the following setting layer depth:

3.6.1.1.1. Setting Layer: Allow 3 inches of planting soil.

3.6.1.2. Container-Grown Trees and Shrubs: Excavate to container width and depth, plus the following setting-layer depth:

3.6.1.2.1. Setting Layer: Allow 3 inches of planting soil.

3.6.2. Dispose of subsoil removed from landscape excavations. Do not mix with planting soil or use as backfill.

3.6.3. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

3.6.4. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

3.7. **PLANTING TREES AND SHRUBS:**

3.7.1. Set balled and burlapped stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.

3.7.1.1. Place stock on setting layer of compacted planting soil.

3.7.1.2. Remove burlap and wire baskets from tops of balls and partially from sides, but do not remove from under balls unless burlap is nylon or polyester treated. Remove pallets, if any, before setting. Do not use planting stock if ball is cracked or broken before or during planting operation. Remove nylon or polyester treated burlap and roping completely.

3.7.1.3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

3.7.2. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.

3.7.2.1. Carefully remove containers so as not to damage root balls.

3.7.2.2. Place stock on setting layer of compacted planting soil.

3.7.2.3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

3.7.3. Set bare-root stock on cushion of planting soil. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers above roots. Remove injured roots by cutting cleanly; do not break.

3.7.3.1. Set collar 2-3 inches above adjacent finish grades, unless otherwise indicated.

3.7.4. Dish and tamp top of backfill to form a 3-inch-high mound around the rim of the pit. Do not cover top of root ball with backfill.

3.7.5. Wrap trees of 2-inch caliper and larger with trunk- wrap tape. Start at base of trunk and spiral cover trunk to height of first branches. Overlap wrap, exposing half the width, and securely attach without causing girdling. Inspect tree trunks for injury, improper pruning, and insect infestation and take corrective measures required before wrapping.

3.8. **TREE AND SHRUB PRUNING:**

3.8.1. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are size after pruning.

3.9. **TREE AND SHRUB GUYING AND STAKING:**

3.9.1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2- inch caliper only as required to prevent wind tip- out. Use a minimum of 2 stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches above grade. Set vertical stakes and space to avoid penetrating balls or root masses. Support trees with 2 nylon straps with a slip knot (see details). Allow enough slack to avoid rigid restraint of tree. ArborTie is acceptable.

3.10. **PLANTING GROUND COVER AND PLANTS:**

3.10.1. Space ground cover and plants as indicated on plans.

3.10.2. Dig holes large enough to allow spreading of roots and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.11. **MULCHING:**

3.11.1. Mulch backfilled surfaces of pits, trenches, planted areas, and other areas indicated.

3.11.2. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems. Mulch shall be Brown shredded hardwood mulch unless otherwise stated on plans.

3.11.2.1. Thickness: 3-inches.

3.12. **SEEDING NEW LAWNS:**

3.12.1. Sow seed with a spreader or a seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.

3.12.1.1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

3.12.2. Sow seed at the following rates:

3.12.2.1. Seeding Rate: 8.0 lbs. per 1000 sq. ft.

3.12.3. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.

3.12.4. Protect seeded slopes exceeding 3:1 against erosion with jute or coir-fiber erosion-control mesh installed and stapled according to manufacturer's recommendations.

3.13. **HYDROSEEDING NEW LAWNS:**

3.13.1. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

3.13.1.1. Mix slurry with nonasphaltic tackifier.

3.13.1.2. Apply slurry uniformly to all areas to be seeded in a 1- step process. Apply mulch at the minimum rate of 1500 lb per acre dry weight but not less than the rate required to obtain specified seed- sowing rate.

3.13.1.3. Apply slurry uniformly to all areas to be seeded in a 2- step process. Apply first slurry application at the minimum rate of 500 lb per acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb per acre.

3.14. **INSTALLATION OF MISCELLANEOUS MATERIALS:**

3.14.1. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.

3.14.1.1. When deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting.

3.15. **CLEANUP AND PROTECTION:**

3.15.1. During landscaping, keep pavements clean and work area in an orderly condition.

3.15.2. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.16. **DISPOSAL OF SURPLUS AND WASTE MATERIALS:**

3.16.1. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 02900

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

1.2.2. Cast-in-place concrete includes the following:

1.2.2.1 Building slab-on grades.

1.2.2.2 Exterior generator pad.

1.2.2.3 Exterior concrete sign foundations.

1.2.2.4. Exterior concrete patio areas.

1.2.3. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.3.1. Division 2 Section "Portland Cement Concrete Paving" for concrete paving cubs/gutters and walks.

1.3. **SUBMITTALS:**

1.3.1. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

1.3.2. Product data for admixtures, patching compounds, curing compounds and others if requested by Architect.

1.3.3. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

1.3.4. Laboratory test reports mix design test.

1.4. **QUALITY ASSURANCE:**

1.4.1. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1.4.1.1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."

1.4.1.2. ACI 318, "Building Code Requirements for Reinforced Concrete."

1.4.1.3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

PART 2 - PRODUCTS

2.1. **FORM MATERIALS:**

2.1.1. Forms for Exposed Finish Concrete: Plywood, metal, metal- framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

2.1.2. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

2.1.3. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2. **REINFORCING MATERIALS:**

2.2.1. Reinforcing Bars: ASTM A 615 Grade 60 deformed.

2.2.2. Steel Wire: ASTM A 82, plain, cold-drawn steel.

2.2.3. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

2.2.4. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

2.3. **CONCRETE MATERIALS:**

2.3.1. Portland Cement: ASTM C 150, Type I.

2.3.1.1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

2.3.2. Fly Ash: ASTM C 618, Type F.

2.3.3. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

2.3.3.1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.

2.3.3.2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

2.3.4. Water: Potable.

2.3.4.1. Forta, Forta Corp.

2.3.4.2. Polystrand, Metalcrete Industries

2.3.5. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

2.3.6. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

2.3.6.1. Products: Subject to compliance with requirements, provide one of the following:

Air-Tite, Cormix Construction Chemicals.
Air-Mix or Perma-Air, Euclid Chemical Co.
Darex AEA or Daravair, W.R. Grace & Co.
MB-VR or Micro-Air, Master Builders, Inc.
Sealtight AEA, W.R. Meadows, Inc.
Sika AER, Sika Corp.

2.3.7. Water-Reducing Admixture: ASTM C 494, Type A.

2.3.7.1. Products: Subject to compliance with requirements, provide one of the following:

Chemtard, ChemMasters Corp.
PSI N, Cormix Construction Chemicals.
Eucon WR-75, Euclid Chemical Co.
WRDA, W.R. Grace & Co.
Pozzolith Normal or Polyheed, Master Builders, Inc.
Metco W.R., Metalcrete Industries.
Prokrete-N, Prokrete Industries.
Plastocrete 161, Sika Corp.

2.3.8. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

2.3.8.1. Products: Subject to compliance with requirements, provide one of the following:

Super P, Anti-Hydro Co., Inc.
Cormix 200, Cormix Construction Chemicals.
Eucon 37, Euclid Chemical Co.
WRDA 19 or Daracem, W.R. Grace & Co.
Rheobuild or Polyheed, Master Builders, Inc.
Superslump, Metalcrete Industries.
PSPL, Prokrete Industries.
Sikament 300, Sika Corp.

2.3.9. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

2.3.9.1. Products: Subject to compliance with requirements, provide one of the following:

Q-Set, Conspec Marketing & Manufacturing Co.
Lubricon NCA, Cormix Construction Chemicals.
Accelguard 80, Euclid Chemical Co.
Daraset, W.R. Grace & Co.
Pozzutec 20, Master Builders, Inc.
Accel-Set, Metalcrete Industries.

2.3.10. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

2.3.10.1. Products: Subject to compliance with requirements, provide one of the following:

PSI-R Plus, Cormix Construction Chemicals.
Eucon Retarder 75, Euclid Chemical Co.
Daratard-17, W.R. Grace & Co.
Pozzolith R, Master Builders, Inc.
Protard, Prokrete Industries.
Plastiment, Sika Corporation.

2.4. **RELATED MATERIALS:**

2.4.1. Capillary Break: N.57 crushed stone.

2.4.2. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

2.4.2.1. Water-resistant barrier consisting of heavy kraft papers laminated together with glass-fiber reinforcement and overcoated with black polyethylene on each side.

2.4.2.1.1. Product: Subject to compliance with requirements, provide Moistop by Fortifiber Corporation.

2.4.3. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. complying with AASHTO M 182, Class 2.

2.4.4. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

Waterproof paper.
Polyethylene film.
Polyethylene-coated burlap.

2.4.5. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. m when applied at 200 sq. ft./gal.

2.4.5.1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

A-H 3 Way Sealer, Anti-Hydro Co., Inc.
Spartan-Cote, The Burke Co.
Conspec #1, Conspec Marketing & Mfg. Co.
Sealco 309, Cormix Construction Chemicals.
Day-Chem Cure and Seal, Dayton Superior Corp.
Eucocure, Euclid Chemical Co.
Horn Clear Seal, A.C. Horn, Inc.
L&M Cure R, L&M Construction Chemicals, Inc.
Masterkure, Master Builders, Inc.
CS-309, W.R. Meadows, Inc.
Seal N Kure, Metalcrete Industries.
Kure-N-Seal, Sonneborn-Chemrex.
Stontop CS2, Stonhard, Inc.

2.4.6. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

2.4.6.1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

K-15, Ardex, Inc.
Self-Leveling Wear Topping, W.R. Bonsal Co.
Conflow, Conspec Marketing and Mfg. Co.
Corlevel, Cormix Construction Chemicals.
LevelLayer II, Dayton Superior Corp.
Flo-Top, Euclid Chemical Co.
Gyp-Crete, Gyp-Crete Corp.
Levelex, L&M Construction Chemicals, Inc.
Underlayment 110, Master Builders, Inc.
Stoncrete UL1, Stonhard, Inc.
Concrete Top, Symons Corp.
Thoro Underlayment Self-Leveling, Thoro System Products.

2.4.7. Bonding Agent: Polyvinyl acetate or acrylic base.

2.5. **PROPORTIONING AND DESIGNING MIXES:**

2.5.1. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

2.5.1.1. Limit use of fly ash to not exceed 25 percent of cement content by weight.

2.5.2. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.

2.5.3. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

2.5.3.1. Floor Slabs: 3,000 psi, 28-day compressive strength; water- cement ratio, 0.57 maximum (non-air-entrained), 0.48 maximum (air-entrained).

2.5.3.2. Exterior patios: 3,000 psi, 28-day compressive strength; water-cement ratio, 0.68 maximum (non-air-entrained), 0.59 maximum (air-entrained).

2.5.3.3. Sidewalks: 2,500 psi, 28-day compressive strength; water- cement ratio, 0.67 maximum (non-air-entrained), 0.67 maximum (air-entrained).

2.5.3.4. Generator Pad: 4,000 psi, 28-day compressive strength; water-cement ratio, 0.68 maximum (non-air-entrained), 0.59 maximum (air-entrained).

2.5.4. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

2.5.4.1. Subjected to freezing and thawing: W/C 0.45.

2.5.5. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

2.5.5.1. Ramps, slabs, and sloping surfaces: 4 inches + 1 inch.

2.5.5.2. Reinforced foundation systems: 3 inches + 1 inch.

2.5.5.3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8-inches after adding admixture to site-verified 2 - 3-inch slump concrete.

2.5.6. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.6. **CONCRETE MIXING:**

2.6.1. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.

2.6.1.1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1. **GENERAL:**

3.1.1. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2. **FORMS:**

3.2.1. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

3.2.1.1. Provide Class A tolerances for concrete surfaces exposed to view.

3.2.1.2. Provide Class C tolerances for other concrete surfaces.

3.2.2. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

3.2.3. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

3.2.4. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

3.2.5. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

3.2.6. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3. **VAPOR RETARDER/BARRIER INSTALLATION:**

3.3.1. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

3.3.2. Lap joints 12 inches.

3.4. **PLACING REINFORCEMENT:**

3.4.1. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

3.4.1.1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

3.4.2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

3.4.3. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.

3.4.4. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.4.5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5. **JOINTS:**

3.5.1. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.

3.5.2. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

3.5.3. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

3.5.4. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

3.5.5. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs- on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.5.5.1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.5.6. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.

3.5.6.1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

3.5.6.2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3.5.6.3. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6. **INSTALLING EMBEDDED ITEMS:**

3.6.1. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

3.6.2. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7. **PREPARING FORM SURFACES:**

3.7.1. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

3.7.2. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

3.8. **CONCRETE PLACEMENT:**

3.8.1. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

3.8.2. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

3.8.3. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

3.8.4. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

3.8.4.1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.

3.8.4.2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators 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 set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

3.8.5. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

3.8.5.1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

3.8.5.2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3.8.5.3. Maintain reinforcing in proper position on chairs during concrete placement.

3.8.6. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

3.8.7. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

3.8.7.1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3.8.7.2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

3.8.8. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

3.8.8.1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. Mixing water may be chilled 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.

3.8.8.2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3.8.8.3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

3.8.8.4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9. **FINISHING FORMED SURFACES:**

3.9.1. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

3.10. **MONOLITHIC SLAB FINISHES:**

3.10.1. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

3.10.1.1. After placing slabs, finish surface to tolerances of F 15 (floor flatness) and F 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

3.10.2. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified.

3.10.2.1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power- driven floats, or both. Consolidate surface with power- driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F 18 (floor flatness) and F 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

3.10.3. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

3.10.3.1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F 20 (floor flatness) and F 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

3.10.4. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

3.10.5. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, and elsewhere as indicated.

3.10.5.1. Immediately after float finishing, slightly roughen concrete 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:**

3.11.1. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, 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 shown or required to complete Work.

3.11.2. 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.

3.11.3. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.11.4. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12. **CONCRETE CURING AND PROTECTION:**

3.12.1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation- control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

3.12.2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

3.12.3. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

3.12.4. Provide moisture curing by the following methods:

3.12.4.1. Keep concrete surface continuously wet by covering with water.

3.12.4.2. Use continuous water-fog spray.

3.12.4.3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4 inch lap over adjacent absorptive covers.

3.12.5. Provide moisture-retaining cover curing as follows:

3.12.5.1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.12.6. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:

3.12.6.1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.12.6.2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

3.12.7. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

3.12.7.1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13. **REMOVING FORMS:**

3.13.1. General: Formwork not supporting weight of concrete, may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

3.14. **REUSING FORMS:**

3.14.1. 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-coating compound as specified for new formwork.

3.14.2. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.15. **CONCRETE SURFACE REPAIRS:**

3.15.1. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.

3.15.2. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

3.15.2.1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

3.15.2.2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas 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.

3.15.3. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

3.15.3.1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

3.15.4. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

3.15.4.1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

3.15.4.2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3.15.4.3. Correct low areas in unformed surfaces 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. Proprietary underlayment compounds may be used when acceptable to Architect.

3.15.4.4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

3.16. **QUALITY CONTROL TESTING DURING CONSTRUCTION:**

3.16.1. General: Owner/City will employ a testing agency to perform tests and to submit test reports.

3.16.2. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

3.16.2.1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

3.16.2.1.1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

3.16.2.1.2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

3.16.2.1.3. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below, when 80 deg F and above, and one test for each set of compressive-strength specimens.

3.16.2.1.4. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive- strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

3.16.2.1.5. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

3.16.2.2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

3.16.2.3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

3.16.2.4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

3.16.3. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

3.16.4. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

3.16.5. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END SECTION 03300

SECTION 04810 - UNIT MASONRY ASSEMBLIES

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1. This Section includes unit masonry assemblies consisting of the following:

1.2.1.1 Concrete masonry units

1.2.1.2 Face brick.

1.2.1.3 Cast stone masonry.

1.2.1.4 Mortar and grout.

1.2.1.5 Masonry joint reinforcement.

1.2.1.6 Ties and anchors.

1.2.1.7 Embedded flashing.

1.2.1.8 Miscellaneous masonry accessories.

1.2.2. Related Sections include the following:

1.2.2.1. Division 7 Section "Joint Sealants" for brick masonry control joints in unit masonry.

1.2.3. Products installed, but not furnished, under this Section include the following:

1.2.3.1. Steel lintels for unit masonry, furnished under Division 5 Section "Metal Fabrications."

1.3 **DEFINITIONS**

1.3.1. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 **PERFORMANCE REQUIREMENTS**

1.4.1. Provide unit masonry that develops indicated net-area compressive strengths (f'_m) at 28 days.

1.4.2. Determine net-area compressive strength (f'_m) of masonry by testing masonry prisms according to ASTM C 1314.

1.5 **SUBMITTALS**

1.5.1. Product Data: For each type of product indicated.

1.5.2. Samples for Initial Selection: For the following:

1.5.2.1. Concrete Masonry.

1.5.2.2 Face brick.

1.5.2.3 Cast stone

1.5.2.4. Colored brick mortar.

1.5.2.5 Mortar sand.

1.5.3. Samples for Verification: For each type and color of the following:

Face brick, in the form of sample panel.

1.5.3.2 Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.

1.5.4. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1.5.4.1. Masonry units.

1.5.4.1.1. Include material test reports substantiating compliance with requirements.

1.5.4.1.2. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.

1.5.4.1.3. For exposed brick, include material test report for efflorescence according to ASTM C 67.

1.5.4.2. Cementitious materials. Include brand, type, and name of manufacturer.

1.5.4.3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

1.5.4.4. Grout mixes. Include description of type and proportions of ingredients.

1.5.4.5. Reinforcing bars.

1.5.4.6. Joint reinforcement.

1.5.4.7. Anchors, ties, and metal accessories.

1.5.5. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1.5.5.1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.

1.5.5.2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.5.6. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.5.7. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.6 QUALITY ASSURANCE

1.6.1. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

1.6.2. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

1.6.3. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

1.6.4. Mock-Up Panel: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.

1.6.4.1. Build sample panels for typical exterior wall in sizes approximately 48 inches long by 48 inches high by full thickness including the concrete masonry inner wythe, dampproofing, wall ties, cavity insulation, and flashing.

1.6.4.2. Clean one-half of exposed faces of panels with masonry cleaner indicated.

1.6.4.3. Protect approved sample panels from the elements with weather-resistant membrane.

1.6.4.4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

1.6.4.4.1. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

1.7 **DELIVERY, STORAGE, AND HANDLING**

1.7.1. Store masonry units 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. If units become wet, do not install until they are dry.

1.7.2. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.7.3. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

1.7.4. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

1.7.5. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 **PROJECT CONDITIONS**

1.8.1. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1.8.1.1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

1.8.2. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1.8.2.1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

1.8.2.2. Protect sills, ledges, and projections from mortar droppings.

1.8.2.3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

1.8.2.4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

1.8.3. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.8.3.1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

1.8.4. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**

2.1.1. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

2.1.1.1. Products: Subject to compliance with requirements, provide one of the products specified.

2.1.1.2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MASONRY UNITS, GENERAL

2.2.1. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.3 CONCRETE MASONRY UNITS (CMUs)

2.3.1. Shapes: Provide shapes indicated and as follows:

2.3.1.1. Provide square-edged units for outside corners, unless otherwise indicated.

2.3.2. Concrete Masonry Units: ASTM C 90.

2.3.2.1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.

2.3.2.2. Weight Classification: Normal weight.

2.3.2.3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.4 BRICK

2.4.1. General: Provide shapes indicated and as follows:

2.4.1.1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2.4.1.2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

2.4.1.3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

2.4.1.4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

2.4.2. Face Brick: ASTM C 216, Grade MW or SW, Type FBX.

2.4.2.1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.

2.4.2.2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.

2.4.2.3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

2.4.2.4. Size (Actual Dimensions): 3-5/8 inches wide by 3-5/8 inches high by 7-5/8 inches long.

2.4.2.5. Application: Use where brick is exposed, unless otherwise indicated.

2.4.2.6. Products:

2.4.2.6.1. Triangle Brick Company, Moncure, North Carolina (800-672-8547), North Carolina Flashed Red, Wirecut

2.4.2.6.2 Size: Utility Closure (3-9/16” H x 3-9/16” D x 7-9/16” L).

2.5 CAST STONE MASONRY

2.5.1 Materials: Provide units including shapes per drawing detail.

2.5.1.1 Products: Continental Cast Stone Manufacturing – Color to be selected.

2.6 MORTAR AND GROUT MATERIALS

2.6.1. Colored Cement Product: Packaged blend made from masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

2.6.1.1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

2.6.1.2. Pigments shall not exceed 10 percent of portland cement by weight.

2.6.1.3 Pigments shall not exceed 5 percent of masonry cement by weight.

2.6.1.4. Products:

2.6.1.4.1. Colored Masonry Cement:

a. Capital Materials Corporation; Flamingo Color Masonry Cement.
b. Essroc, Italcementi Group; Brixment-in-Color.
c. Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
d. Lehigh Cement Company; Lehigh Custom Color Masonry Cement.

2.6.2. Aggregate for Mortar: ASTM C 144.

2.6.2.1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2.6.2.2 For joints less than 1/4-inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

2.6.2.3. Colored-Mortar Aggregates: Natural white sand or crushed white stone necessary to produce required mortar color.

2.6.3. Aggregate for Grout: ASTM C 404.

2.6.4. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

2.6.4.1. Products:

a. Euclid Chemical Company (The); Accelguard 80.
b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
c. Sonneborn, Div. of ChemRex; Trimix-NCA.

2.6.5. Water: Potable.

2.7 REINFORCEMENT

2.7.1. Masonry Joint Reinforcement, General: ASTM A 951.

a. Exterior Walls: Hot-dip galvanized, carbon steel.
b. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
c. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
d. Wire Size for Veneer Ties: W1.7 or 0.148-inch diameter.
e. Spacing of Cross Rods, Tabs, and Cross Ties: 16 inches o.c.
f. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.7.2. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.7.3. Masonry Joint Reinforcement for Multiwythe Masonry:

2.7.3.1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod at each wythe of masonry 4 inches or less in width.

2.7.3.2. Tab type truss design, with 1 side rod at each face shell of backing wythe and with cavity side eyelets and tabs sized adjustable outer wythe tie equivalent to Hohmann & Barnard #165 Adjustable Truss Reinforcement.

2.8 TIES AND ANCHORS

2.8.1. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.

2.8.1.1 Hot-Dip Galvanized, Carbon Steel Wire: ASTM A 82; with ASTM A 153/A 153MM, Class B-2 coating.

2.8.1.2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.

2.8.2. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

2.8.3. Adjustable Masonry-Veneer Anchors

2.8.3.1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

2.8.3.1.1 Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.

2.8.3.2 Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

2.8.3.2.1. Anchor Section: Sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie.

2.8.3.2.2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.067-inch- thick, steel sheet, galvanized after fabrication.

2.8.3.2.3. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188-inch- diameter, hot-dip galvanized steel wire.

2.8.3.2.3.1. Products:

a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 210 with D/A 700-708.
b. Heckmann Building Products Inc.; 315-D with 316.
c. Hohmann & Barnard, Inc.; VB.
d. Wire-Bond; 1004, Type III.

2.8.3.3. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads.

2.8.3.3.1. Products:

2.8.3.3.1.1. Dayton Superior Corporation, Dur-O-Wal Division; Stainless Steel SX Fastener.

2.8.3.3.1.2. ITW Buildex; Scots long life Teks.

2.8.3.3 Thru wall masonry veneer anchors:

2.9 EMBEDDED FLASHING MATERIALS

2.9.1. Flexible Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:

2.9.1.1. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.

2.9.1.1.1. Products:

a. Advanced Building Products Inc.; Cop-R-Cote.
b. AFCO Products Inc.; Cop-A-Cote.
c. Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
d. Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
e. Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
f. York Manufacturing, Inc.; Copperseal.

2.9.2. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

2.10.1. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

2.10.2. Weep Products: Use one of the following, unless otherwise indicated:

2.10.2.1. Wicking Material: Absorbent rope, made from UV-resistant synthetic fiber, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity between wythes. Use only for weeps.

2.10.2.2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

2.10.2.2.1. Products:

a. Heckmann Building Products Inc.; No. 85 Cell Vent.
b. Hohmann & Barnard, Inc.; Quadro-Vent.
c. Wire-Bond; Cell Vent.
d. Archovations, Inc

2.10.3. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

2.10.3.1. Provide one of the following configurations:

2.10.3.1.1 Cavity, nominal 1 ½" full-height cavity mortar mesh.

2.10.3.1.2. Strips, 1-inch thick and 12-inches wide, with dovetail shaped notches 4-inches deep mortar mesh.

2.10.3.2. Products:

a. Advanced Building Products Inc.; Mortar Break.
b. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
c. Archovations, Inc
d. Mortar Net USA, Ltd.; Mortar Net.

2.11 MASONRY CLEANERS

2.11.1. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.11.1.1. Manufacturers:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

2.12.1. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

2.12.1.1. Do not use calcium chloride in mortar or grout.

2.12.1.2 Limit cementitious materials in mortar to portland cement, mortar cement, and lime.

2.12.1.3 Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement, mortar cement, and lime.

2.12.1.4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

2.12.2. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

2.12.3. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.

2.12.3.1. For exterior, above-grade, brick veneer, use Type S.

2.12.4. Grout for Unit Masonry: Comply with ASTM C 476.

2.12.4.1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

2.12.4.2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

3.1.1.1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

3.1.1.2. Verify that foundations are within tolerances specified.

3.1.1.3. Verify that reinforcing dowels are properly placed.

3.1.2. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

3.1.3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

3.2.1. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

3.2.2. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

3.2.3. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2.4. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3.2.4.1. Mix units from several pallets or cubes as they are placed.

3.2.5. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2.6. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

3.2.6.1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

3.2.6.2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

3.2.6.3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

3.2.6.4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3.2.6.5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.2.6.6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3.3 LAYING MASONRY WALLS

3.3.1. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

3.3.2. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

3.3.3. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

3.3.4. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

3.3.5. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

3.4 MORTAR BEDDING AND JOINTING

3.4.1. Lay hollow brick and concrete masonry units as follows:

3.4.1.1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.

3.4.1.2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.

3.4.1.3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.

3.4.1.4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

3.4.2. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

3.4.3. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.5 **COMPOSITE MASONRY**

3.5.1. Bond wythes of composite masonry together using one of the following methods:

3.5.1.1. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

3.5.1.1.1. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.

3.5.2. Bond wythes of composite masonry together using bonding system indicated on Drawings.

3.5.3. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.

3.5.3.1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

3.6 **ANCHORING MASONRY VENEERS**

3.6.1. Anchor masonry veneers to conrete masonry inner wythe to comply with the following requirements:

3.6.1.1. Install combination (two-piece) wall reinforcing/cavity thru-wall tie in concrete masonry inner wythe.

3.6.1.2. Insert slip-in adjustable brick anchors into concrete masonry joint reinforcing thru-wall anchor loops.

3.6.1.3. Install brick veneer anchors as indicated, but not more than 16” o.c. vertically and 32” o.c. horizontally with not less than one anchor for 3.5 sq.ft. of veneer area. Install additional anchors within 12” of wall openings and at intervals, not exceeding 36 inches, around perimeter.

3.6.2. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:

3.6.2.1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

3.6.2.2. Insert slip-in anchors in metal studs as sheathing is installed. Provide one anchor at each stud in each horizontal joint between sheathing boards.

3.6.2.3. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.

3.6.2.4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

3.6.2.5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 32 inches o.c. horizontally with not less than 1 anchor for each 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.7 CONTROL JOINTS

3.7.1. General: Install control joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

3.7.2. Form control joints in brick as follows:

3.7.2.1. Build in compressible joint fillers where indicated.

3.7.2.2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants."

3.8 LINTELS

3.8.1. Install steel lintels where indicated.

3.8.2. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.9 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

3.9.1. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

3.9.2. Install flashing as follows, unless otherwise indicated:

3.9.2.1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

3.9.2.2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.

3.9.2.3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

3.9.2.4. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

3.9.3. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

3.9.4. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.9.5. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

3.9.5.1. Use specified weep products to form weep holes.

3.9.5.2. Space weep holes formed from plastic tubing or wicking material 16-inches o.c.

3.9.5.3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

3.9.5.4. Trim wicking material flush with outside face of wall after mortar has set.

3.9.6. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

3.10 REPAIRING, POINTING, AND CLEANING

3.10.1. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

3.10.2. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

3.10.3. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

3.10.4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

3.10.4.1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

3.10.4.2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3.10.4.3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

3.10.4.4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

3.10.4.5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.11 MASONRY WASTE DISPOSAL

3.11.1. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

3.11.2. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off property.

END OF SECTION 04810

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 **SUMMARY**

1.1.1 Section Includes:

1.1.1.1. Fabrication and erection of structural steel framing members, as defined in AISC Code and as indicated on the drawings.

1.1.1.2. Welding.

1.1.1.3. Shop painting.

1.1.2. Products Furnished but Not Installed under This Section:

1.1.2.1. Steel anchorages embedded in masonry.

1.1.3. Related Sections:

1.1.3.1. Steel joists: Elsewhere in Division 5.

1.1.3.2. Steel decking: Elsewhere in Division 5.

1.1.3.3. Light gauge metal framing: Elsewhere in Division 5.

1.1.3.4. Miscellaneous metal fabrications: Elsewhere in Division 5.

1.2 **REFERENCES**

1.2.1. ANSI/AWS D1.1-92 -- Structural Welding Code -- Steel; American Welding Society; 1992.

1.2.2. ASTM A 36/A 36M-91 -- Standard Specification for Structural Steel; 1991.

1.2.3. ASTM A 123-89a -- Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1989.

1.2.4. ASTM A 307-92a -- Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 1992.

1.2.5. ASTM A 325-91c -- Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 1991.

1.2.6. ASTM A 501-89 -- Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 1989.

1.2.7. Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc. (AISC); 1986.

1.2.8. CRD-C 621-91 -- Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); ASTM C 1107-89a; U.S. Department of the Army, Corps of Engineers; 1991.

1.2.9. FS TT-P-664D -- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant; 1988.

1.2.10. Specification for Structural Steel Buildings -- Allowable Stress Design and Plastic Design; American Institute of Steel Construction, Inc. (AISC); 1989.

1.2.11. Specification for Structural Joints Using ASTM A325 or A490 Bolts; Research Council on Structural Connections; American Institute of Steel Construction, Inc. (AISC); 1985.

1.2.12. Steel Structures Painting Manual, Volume 2, Systems and Specifications; Steel Structures Painting Council (SSPC); 1991.

1.3. DEFINITIONS

1.3.1. Structural Steel: Items as listed in 2.1 of AISC "Code of Standard Practice for Steel Buildings and Bridges," and excluding steel, iron, or other metal items not listed, even if attached to the structural framing.

1.4 SYSTEM DESCRIPTION

1.4.1. General: Unless otherwise specifically approved in writing, furnish exact sections, weights, and kinds of material specified, using details and dimensions shown.

1.4.1.1. Not all connections are detailed; similar details apply to similar conditions, unless otherwise indicated. Contact the architect promptly to verify design of members or connections in any situation where design requirements are unclear.

1.5. SUBMITTALS

1.5.1. Product Data: Producer's or manufacturer's information for products as follows, including sufficient data to show compliance with specified requirements:

1.5.1.1. Specifications for primer paint, including manufacturer's data on chemical composition, adhesion of spray fireproofing, and dry film thickness per applied coat.

1.5.1.2. Specifications for nonshrink grout.

1.5.2. Shop Drawings: Complete drawings for structural steel, including information on location, type, and size of all connections, distinguishing between those made in the shop and those made in the field.

1.5.2.1. Indicate weld lengths and sizes, using standard American Welding Society (AWS) welding symbols.

1.5.2.2. Include setting drawings and templates for anchorages to be installed by others.

1.5.2.3. The fabricator is specifically responsible for the adequacy of any connections designed by the fabricator to performance standards established in the contract documents. Approval by the architect of shop drawings shall not relieve the fabricator of this responsibility, despite wording to the contrary in paragraph 4.2.1 of the AISC Code.

1.5.3. Welder Qualifications: Evidence that welders employed in the work are currently certified under American Welding Society (AWS) qualification procedures.

1.6. **QUALITY ASSURANCE**

1.6.1. Welding Procedures: Establish that joint welding procedures are prequalified or test in accordance with American Welding Society (AWS) qualification procedures.

1.6.2 Welder Qualifications: Welders must be currently certified under American Welding Society (AWS) qualification procedures.

1.6.3. Regulatory Requirements: Unless other requirements of governing authorities or particular requirements of this specification are more stringent, comply with provisions of the following:

1.6.3.1. AISC "Code of Standard Practice for Steel Buildings and Bridges."

1.6.3.2. AISC "Specification for Structural Steel Buildings -- Allowable Stress Design and Plastic Design," with Commentary and Supplements.

1.6.3.3. ANSI/AWS D1.1, "Structural Welding Code - Steel."

1.6.4. Testing and Inspection Agency: The owner will engage an independent testing and inspection agency to perform testing, inspect and evaluate connections, and prepare test reports.

1.6.4.1. Correct deficiencies in the structural steel work identified by the testing and inspection agency at no additional expense to the owner. Subsequent tests to confirm the adequacy of corrected work will be at the contractor's expense.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1. Shipping: Deliver steel in timely fashion, to permit the most efficient and economical flow of work. Deliver steel members properly marked for field assembly and erection.

1.7.1.1. Deliver anchor bolts, washers, and other anchorage devices to be built into other work in time to avoid delays and permit their proper installation.

1.7.2. Storage: Protect steel and other materials of this section from damage and corrosion. If temporary storage at the project site is required, keep steel members off the ground, using platforms or pallets, in location easily accessible for inspection.

PART 2 - PRODUCTS

2.1. STEEL MATERIALS

2.1.1. Structural Steel Wide Flange Members: ASTM A 992, Fy=50 ksi.

2.1.2. Hollow Structural Sections (HSS):

2.1.2.1. Rectangular: ASTM A 500, Grade B, Fy=46 ksi.

2.1.2.2. Round: ASTM A 500, Grade B, Fy=42 ksi.

2.1.3. Miscellaneous Structural Steel: ASTM A 36, Fy=36 ksi.

2.1.4. Anchor Bolts: ASTM A 307, Carbon steel, Grade C; ASTM A 36 steel plate washers.

2.1.5. Carbon Steel Bolts and Nuts: ASTM A 307, Grade A.

2.1.6. High-Strength Bolts, Nuts, and Washers: ASTM A 325.

2.1.6.1. Type 1, plain (medium carbon steel).

2.1.7. Direct Tension Indicators: Load indicator washers or snap-off high-strength bolts certified to provide the minimum fastener tension in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts" may be used at connections requiring high-strength bolts, at the contractor's option.

2.2. **MISCELLANEOUS MATERIALS**

2.2.1. Welding Electrodes and Fluxes: ANSI/AWS D1.1; types as required by materials being welded.

2.2.2. Nonshrink Grout: Prepackaged material requiring only the addition of water and complying with CRD-C 621, Grade B, and as follows:

2.2.2.1. Metallic type.

2.2.3. Shop Primer: Rust-inhibitive, lead and chromate free, low VOC primer, complying with FS TT-P-664, or equivalent.

2.3. **FABRICATION**

2.3.1. Shop Assembly - General: Comply with requirements of AISC Specifications. Shop fabricate and assemble to maximum degree possible.

2.3.2. Thermal Cutting: Perform thermal cutting by machine, to the greatest extent possible.

2.3.2.1. Plane thermally cut edges which are to be welded.

2.3.3. Connections:

2.3.3.1. Shop connections: Welded, unless bolts are specifically indicated.

2.3.3.2. Field connections: Welded or bolted, as required.

2.3.3.3. Bolts: High-strength steel bolts, except as otherwise indicated.

2.3.3.3.1. Bolting: Comply with requirements of AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

2.3.4. Welds: Comply with requirements of AWS Code for welding procedures and quality of welds, including appearance.

2.3.4.1. Built-up sections: Assemble components and weld using procedures which will maintain proper alignment of finished section.

2.3.5. Finishing: Accurately mill ends of columns and other members which must transmit loads in bearing.

2.3.6. Holes in Steel Members: Make all holes by means of cutting, drilling, or punching at right angles to surface of metal. Do not make or enlarge holes by burning.

2.3.6.1. Provide holes in steel members as required to permit connection of work by others.

2.4. **SHOP COATING - GALVANIZING**

2.4.1. Galvanize the following items:

2.4.1.1. Lintels.

2.4.2. Preparation: Thoroughly clean members to be galvanized, removing loose rust and mill scale.

2.4.3. Galvanizing: Perform galvanizing after fabrication in accordance with requirements of ASTM A 123.

2.5. **SHOP COATING - PAINT**

2.5.1. Shop prime all steel members, except:

2.5.1.1. Galvanized steel members.

2.5.1.2. Steel members to receive sprayed-on fireproofing.

2.5.1.3. Do not paint the following surfaces:

2.5.1.3.1. Machined or milled surfaces.

2.5.1.3.2. Surfaces adjacent to field welds.

2.5.1.3.3. Faying surfaces of bolted connections.

2.5.2. Preparation: Thoroughly clean steel surfaces to be shop primed, removing loose rust, loose mill scale, dirt, oil, and grease. Clean steel in accordance with SSPC procedures as follows:

2.5.2.1. SSPC-SP 2: Hand tool cleaning.

2.5.3. Painting: As soon as possible after cleaning, apply specified primer paint in accordance with instructions of paint manufacturer, at a rate sufficient to provide a finished thickness of not less than 1.5 mils and an average thickness of 2.0 mils.

2.6. SHOP QUALITY CONTROL

2.6.1. Testing and Inspection:

2.6.1.1. General: Provide access to testing and inspection agency so that specified testing and inspection can be safely accomplished.

2.6.2. Shop bolted connections: Comply with testing and verification procedures in AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

2.6.3. Shop welded connections: Inspect and test shop-fabricated welds as follows:

2.6.3.1. Visually inspect all welds.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions: Examine areas and conditions for erection of structural steel and verify that the work may properly proceed. Do not commence erection of structural steel until unsatisfactory conditions have been corrected or fabricated steel components have been adjusted with the architect's agreement.

3.2. PREPARATION

3.2.1. Temporary Support: Provide temporary guys, braces, falsework, cribbing, or other elements required to secure the steel framing against loads equal in intensity to design loads. Remove such temporary support only when permanent connections have been made and the steel framing is fully capable of supporting design loads, including any temporary construction loads.

3.3. ERECTION

3.3.1. General: Erect structural steel in compliance with AISC Code and Specifications.

3.3.2. Assembly:

3.3.2.1. Set structural members accurately to locations and elevations indicated, within tolerances established in AISC Code, before making final connections.

3.3.2.2. Do not use thermal cutting to correct fabrication errors on any major structural member.

3.3.2.2.1. Thermal cutting of secondary members may be permitted by the architect upon request, but only when members involved are not loaded.

3.3.3. Columns and Bearing Surfaces:

3.3.3.1. Clean bearing and contact surfaces before assembly. Slightly roughen concrete and masonry surfaces to improve bond.

3.3.3.2. Set base and bearing plates accurately, using metal wedges, shims, or setting nuts as required.

3.3.3.3. After tightening anchor bolts and ensuring that structure is plumb, grout solidly between plates and bearing surfaces.

3.3.3.3.1. Comply with manufacturer's instructions for nonshrink grout.

3.3.4. Bolting:

3.3.4.1. Carbon steel bolts: Use only for temporary bracing during erection, unless otherwise specifically permitted by contract documents.

3.3.4.2. High-strength bolts: Comply with requirements of AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

3.3.5. Welding:

3.3.5.1. Do not perform field welding when ambient temperature is at 0 degrees F or below, or when surfaces are wet, exposed to rain, snow, or high wind.

3.3.5.2. Perform field welding in accordance with AWS "Structural Welding Code - Steel."

3.3.5.3. Tighten and leave in place erection bolts used in field-welded construction.

3.4. FIELD QUALITY CONTROL

3.4.1. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.

3.4.1.1. Testing agency will conduct and interpret tests and state in each report whether tested work complied with or deviates from requirements.

3.4.2. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements at no additional cost to the Owner.

3.4.3. Additional testing, at Contractor's expense, will performed to determine compliance of corrected work with specified requirements.

3.4.4. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

3.4.4.1. Direct-tension indicator gaps will be verified to comply with ASTM F 592, Table 2.

3.4.5. In addition to visual inspection, field welded shear connectors will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.

3.4.5.1. Liquid Penetrant Inspection: ASTM E165.

3.4.5.2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

3.4.5.3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."

3.4.5.4. Ultrasonic inspection: ASTM E 164.

3.4.6. In addition to visual inspection, field welded shear connectors will be inspected and tested according to requirements of AWS D1.1 for stud welding and as follows:

3.4.6.1. Bend test will be performed when visual inspections reveal either less than a continuous 360-degree flash or welding repairs to any shear connector.

3.4.6.2. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1

3.4.7. Contractor shall furnish all necessary staging, platforms, ladders, or other items necessary to facilitate the testing laboratory in testing and inspecting the work.

3.4.8. The testing laboratory shall inspect 15% of the field full penetration welds, except at truss splices where 100% shall be inspected. All tested welds shall pass.

3.4.9. The testing laboratory shall inspect 50% of the fillet welds and spot check gauge and length of welds.

3.5. **CLEANING**

3.5.1. Touch-up Painting: Immediately after erection, clean filed welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

3.5.1.1 Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

3.5.2. Touch up all hot dipped galvanized steel with high zinc dust content paint.

3.5.2.1. Fore re-galvanizing welds and steel, comply with SSPC-Paint 20.

END OF SECTION 05120

SECTION 05210 - STEEL JOISTS

PART 1 - GENERAL

1.1. **SUMMARY**

1.1.1. Section Includes:

1.1.1.1. K-series open web steel joists.

1.1.1.2. LH-series, long span, open web steel joists.

1.1.1.3. Bracing.

1.1.2. Related Sections:

1.1.2.1. Structural steel: Elsewhere in Division 5.

1.1.2.2. Metal decking: Elsewhere in Division 5.

1.2. **REFERENCES**

1.2.1. FS TT-P-664D -- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant; 1988.

1.2.2. SJI Technical Digest No. 9 -- Handling and Erection of Steel Joists and Joist Girders; Steel Joist Institute; July 1987.

1.2.3. Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; Steel Joist Institute (SJI); 1990.

1.2.4. Steel Structures Painting Manual, Volume 2, Systems and Specifications; Steel Structures Painting Council (SSPC); 1991.

1.3 **SYSTEM DESCRIPTION**

1.3.1. Provide joist system which is designed and fabricated to comply with requirements of the contract documents and which strictly conforms to material, manufacturing, and erection requirements of the Steel Joist Institute's (SJI) "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (referred to hereinafter as SJI "Specifications").

1.3.1.1. Wind uplift: Design joists and connections to comply with wind uplift requirements indicated.

1.4. **SUBMITTALS**

1.4.1. Product Data: Submit for each distinct type of joist required and for accessories.

1.4.2. Shop Drawings: Drawings for fabrication and erection of joists; include plans, elevations, and large scale details of typical sections, special connections, joining, and accessories.

1.4.2.1. Show location and spacing of joists; indicate mark number and type.

1.4.2.2. Show bridging.

1.4.3. Quality Control Submittals: Submit the following:

1.4.3.1. SJI certification of joist characteristics.

1.5. **DELIVERY, STORAGE, AND HANDLING**

1.5.1. Strictly conform to requirements of SJI Technical Digest No. 9.

PART 2 - PRODUCTS

2.1. **MATERIALS**

2.1.1. Steel: Conform to requirements of SJI "Specifications."

2.1.2. Steel Primer for K-Series Joists: Rust-inhibitive, lead and chromate free, low VOC primer, complying with FS TT-P-664, or equivalent.

2.1.3. Accessories: Provide accessories required for erection of steel joists, complying with SJI "Specifications" and with contract documents.

2.2. **JOIST FABRICATION**

2.2.1. General: All materials shall be clean and straight.

2.2.2. Bridging is schematically shown on drawings. Detail and fabricate bridging in complete accordance with SJI requirements.

2.2.3. Joists:

2.2.3.1. Top cord extensions: Provide extensions where indicated. Extension members shall be designed as cantilever beams, with their reactions carried back at least to the first panel point of the joists.

2.2.3.2. Bottom chords: Form bottom chord members of joists using angles.

2.2.3.3. Bottom chord extensions: Where indicated, provide extended bottom chords or separate extension units properly designed to support ceilings attached directly to joist bottom chords. Maximum clearance between wall finish and end of extension: 1/2 inch, unless indicated otherwise.

2.2.3.4. Special end connections: Provide special end connections where joists bear less than 2-1/2 inches over steel supports. Connections shall provide positive attachment to the support.

2.2.3.5. Surface preparation for shop priming: SSPC-SP 2: Hand tool cleaning.

2.2.3.6. Shop priming: Apply primer in accordance with paint manufacturer's recommendations.

PART 3 - EXECUTION

3.1. ERECTION

3.1.1. Do not begin joist erection until structural support components have been installed and are in suitable condition to receive joists.

3.1.2. Do not overload or exceed carrying capacity of any joist during construction period.

3.1.3. Accurately position and space joists before permanent attachment to structural supports.

3.1.4. Provide safe, stable structure throughout construction period. Do not remove bridging after construction is completed, unless specifically authorized to do so by the architect.

3.1.4.1. Install bridging in accordance with SJI requirements.

3.1.4.2. Bridging installation shall proceed concurrently with joist erection and shall be completed before joists are subjected to construction loads.

3.1.5. K-Series Joist Anchorage:

3.1.5.1. Anchor joists to structural support members as indicated on drawings.

END OF SECTION 05210

SECTION 05310 - STEEL DECK

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

1.2.1. This Section includes the following:

1.2.1.1. Vented Roof deck.

1.3. SUBMITTALS

1.3.1. Product Data: For each type of deck, accessory, and product indicated.

1.3.2. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

1.3.3. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

1.3.4. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.3.5. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

1.3.5.1. Mechanical fasteners.

1.3.6. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4. QUALITY ASSURANCE

1.4.1. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.4.2. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1.4.3. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code—Steel," and AWS D1.3, "Structural Welding Code—Sheet Steel."

1.4.4. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.

1.4.4.1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

1.4.4.2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

1.4.5. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

1.4.6. FM Listing: Provide steel roof deck evaluated by FM and listed in FM's "Approval Guide, Building Materials" for Class 1 fire rating and class 1-90 windstorm ratings.

1.5. DELIVERY, STORAGE, AND HANDLING

1.5.1. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

1.5.2. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.6. COORDINATION

1.6.1. Coordinate installation of sound-absorbing insulation strips in topside ribs of acoustical deck with roofing insulation to ensure protection of insulation strips against damage from effects of weather and other causes.

PART 2 – PRODUCTS

2.1. VENTED ROOF DECK

2.1.1. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with “SDI Specifications and Commentary for Steel Roof Deck,” in SDI Publication No.29, and the following:

2.1.1.1. Prime-Painted Steel Sheet: ASTM A 611, Grade C minimum, shop primed with gray or white baked-on, lead and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.

2.1.1.2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating.

2.1.1.3. Deck Profile: As indicated on plans.

2.1.1.4. Profile Depth: As indicated on plans.

2.1.1.5. Design Uncoated-Steel Thickness: As indicated on plans.

2.1.1.6. Side Laps: Overlapped or interlocking seam at Contractor’s opinion.

2.2. ACCESSORIES

2.2.1. General: Provide manufacturer’s standard accessory materials for deck that comply with requirements indicated.

2.2.2. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

2.2.3. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

2.2.4. Rib Closure Strips: Vulcanized, closed-cell, synthetic rubber.

2.2.5. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

2.2.6. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

2.2.7. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile indicated on plans.

2.2.8. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

2.2.9. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

2.2.10. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.

2.2.11. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch wide flanges and recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.

2.2.12. Flat Sump Plate: Single-piece steel sheet 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

2.2.13. Shear Connectors: ASTM A 108, Grade 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B, with arc shields.

2.2.14. Galvanizing Repair Paint: ASTM A780.

2.2.15. Repair Paint: Lead and chromate free rust-inhibitive primer complying with performance requirements of FS TT-P-664.

PART 3 – EXECUTION

3.1 EXAMINATION

3.1.1. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2. INSTALLATION, GENERAL

3.2.1. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturers written instructions, and requirements in this Section.

3.2.2. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

3.2.3. Locate decking bundles to prevent overloading of supporting members.

3.2.4. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do no stretch or contract side-lap interlocks.

3.2.5. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

3.2.6. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

3.2.7. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

3.2.9. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturers written instructions.

3.3. ROOF DECK INSTALLATION

3.3.1. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter, but not less than 1-1/2 inches long, and as follows:

3.3.1.1. Weld Diameter: As indicated on plans.

3.3.1.2. Weld Spacing: As indicated on plans.

3.3.1.3. Weld Washers: Install weld washers at each weld location.

3.3.2. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 36 inches, and as follows:

3.3.2.1. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.

3.3.2.2. Mechanically clinch or button punch.

3.3.2.3. Fasten with a minimum of 1-1/2-inch long welds.

3.3.3. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2-1/2 inches, with end joints as follows:

3.3.3.1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.

3.3.4. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 12 inches apart with at least 1 weld at each corner.

3.3.5. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

3.3.6. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.3.7. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified in Division 07.

3.4. FIELD QUALITY CONTROL

3.4.1. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.

3.4.2. Field welds will be subject to inspection.

3.4.3. Testing agency will report test results promptly and in writing to Contractor and Architect.

3.4.4. Remove and replace work that does not comply with specified requirements.

3.4.5. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5. REPAIRS AND PROTECTION

3.5.1. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

3.5.2. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint

3.5.2.1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

3.5.3. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes the exterior wall furring and interior wall/partition framing as indicated on the Drawings.

1.2.2. Related Sections include the following:

1.2.2.1. Division 7 Section “Building Insulation” for interior wall/partition batt insulation.

1.2.2.2. Division 9 Section “Gypsum Board” for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3. **PERFORMANCE REQUIREMENTS:**

1.3.1. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1.3.1.1. Design Loads: As follows:

1.3.1.1.1. Dead Loads: Weights of materials and construction.

1.3.1.1.2. Seismic Loads: Aa0:p75, Av 0.075

1.3.1.2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

1.3.1.2.1. Interior Ceiling Joist Framing: Vertical deflection of 1/240 of the span.

1.3.1.3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

1.3.1.4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

1.3.1.4.1. Upward and downward movement of ½ inch.

1.3.1.5. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

1.3.1.5.1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.3.1.5.2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.4. **SUBMITTALS:**

1.4.1. Product Data: For each type of cold-formed metal framing product and accessory indicated.

1.4.2. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.4.2.1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4.3. Welding certificates.

1.4.4. Qualification Data: For professional engineer.

1.4.5. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:

1.4.5.1. Steel sheet.

1.4.5.2. Expansion anchors.

1.4.5.3. Power-actuated anchors.

1.4.5.4. Mechanical fasteners.

1.4.5.5. Vertical deflection clips.

1.4.5.6. Horizontal drift deflection clips

1.4.5.7. Miscellaneous structural clips and accessories.

1.4.6. Research/Evaluation Reports: For cold-formed metal framing.

1.5. **QUALITY ASSURANCE:**

1.5.1. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

1.5.2. 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 cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

1.5.3. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.

1.5.4. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code—Steel," and AWS D1.3, "Structural Welding Code—Sheet Steel."

1.5.5. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.5.6. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1.5.6.1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.6. **DELIVERY, STORAGE, AND HANDLING:**

1.6.1. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

1.6.2. Store cold-formed metal framing protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

2.1.2. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:

2.1.2.1. AllSteel Products, Inc.

2.1.2.2. Consolidated Fabricators Corp.; Building Products Division.

2.1.2.3. Craco Metals Manufacturing, LLC.

2.1.2.4. Dale/Incor.

2.1.2.5. Formetal Co. Inc. (The).

2.1.2.6. Steel Construction Systems.

2.1.2.7. Steeler, Inc.

2.1.2.8. United Metal Products, Inc.

2.2 **MATERIALS:**

2.2.1. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

2.2.1.1. Grade: As required by structural performance.

2.2.1.2. Coating: G90.

2.2.2. Steel Sheet for Vertical Deflection Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:

2.2.2.1. Grade: As required by structural performance.

2.2.2.2. Coating: G90.

2.3 **WALL FRAMING:**

2.3.1. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

2.3.1.1. Minimum Base-Metal Thickness: 0.0538 inch.

2.3.1.2. Flange Width: 2 inches.

2.3.1.3. Section Properties: As required by design.

2.3.2. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

2.3.2.1. Minimum Base-Metal Thickness: Matching steel studs.

2.3.2.2. Flange Width: 1-1/4 inches.

2.3.3. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

2.3.3.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.3.3.1.1. AllSteel Products, Inc.

2.3.3.1.2. Consolidated Fabricators Corp.; Building Products Division.

2.3.3.1.3. Craco Metals Manufacturing, LLC.

2.3.3.1.4. Dale/Incor.

2.3.3.1.5. Formetal Co. Inc. (The).

2.3.3.1.6. Steel Construction Systems.

2.3.3.1.7. Steeler, Inc.

2.3.3.1.8. United Metal Products, Inc.

2.3.4. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

2.3.4.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.3.4.1.1. AllSteel Products, Inc.

2.3.4.1.2. Consolidated Fabricators Corp.; Building Products Division.

2.3.4.1.3. Craco Metals Manufacturing, LLC.

2.3.4.1.4. Dale/Incor.

2.3.4.1.5. Formetal Co. Inc. (The).

2.3.4.1.6. Steel Construction Systems.

2.3.4.1.7. Steeler, Inc.

2.3.4.1.8. United Metal Products, Inc.

2.3.4.2. Minimum Base-Metal Thickness: 0.0966 inch.

2.3.4.3. Flange Width: 1 inch plus the design gap.

2.3.5. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

2.4. **FRAMING ACCESSORIES:**

2.4.1. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

2.4.2. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

2.4.2.1. Supplementary framing.

2.4.2.2. Bracing, bridging, and solid blocking.

2.4.2.3. Web stiffeners.

2.4.2.4. Anchor clips.

2.4.2.5. End clips.

2.4.2.6. Foundation clips.

2.4.2.7. Gusset plates.

2.4.2.8. Stud kickers, knee braces, and girts.

2.4.2.9. Joist hangers and end closures.

2.4.2.10. Hole reinforcing plates.

2.4.2.11. Backer plates.

2.4.2.12. Exterior wall strapping.

2.5 **ANCHORS, CLIPS, AND FASTENERS:**

2.5.1. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.

2.5.2. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153, Class C.

2.5.3. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5.4. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

2.5.5. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

2.5.5.1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.5.6. Welding Electrodes: Comply with AWS standards.

2.6 **MISCELLANEOUS MATERIALS:**

2.6.1. Galvanizing Repair Paint: ASTM A 780.

2.6.2. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

2.6.3. Sealer Gaskets: Closed-cell neoprene foam, ¼ inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 **FABRICATION:**

2.7.1. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

2.7.1.1. Fabricate framing assemblies using jigs or templates.

2.7.1.2. Cut framing members by sawing or shearing; do not torch cut.

2.7.1.3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

2.7.1.3.1. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

2.7.1.3.2. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

2.7.1.4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

2.7.2. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

2.7.3. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

2.7.3.1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2.7.3.2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 **EXAMINATION:**

3.1.1. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

3.1.1.1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **PREPARATION:**

3.2.1. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

3.2.2. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.2.3. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

3.2.4. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 **INSTALLATION, GENERAL:**

3.3.1. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

3.3.2. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

3.3.3. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

3.3.3.1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

3.3.4. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

3.3.4.1. Cut framing members by sawing or shearing; do not torch cut.

3.3.4.2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

3.3.4.2.1. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

3.3.4.2.2. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

3.3.5. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

3.3.6. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

3.3.7. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

3.3.8. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

3.3.9. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

3.3.10. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

3.3.10.1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 **FIELD QUALITY CONTROL:**

3.4.1. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

3.4.2. Field and shop welds will be subject to testing and inspecting.

3.4.3. Testing agency will report test results promptly and in writing to Contractor and Architect.

3.4.4. Remove and replace work where test results indicate that it does not comply with specified requirements.

3.4.5. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 **REPAIRS AND PROTECTION:**

3.5.1. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

3.5.2. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes the following metal fabrications:

1.2.1.1 Rough hardware. (Wood framing anchor bolts and etc).

1.2.1.2 Brick masonry lintels.

1.2.1.3 Exterior/interior metal ladders.

1.2.1.4 Exterior building including tower roof overhang brackets.

1.2.1.5 Prefabricated building/canopy gutter downspout boots.

1.2.1.6 Bus canopy area bollards.

1.2.1.7 Miscellaneous framing and supports.

1.2.1.8 Prefabricated metal window sills.

1.3. **SUBMITTALS:**

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.

1.4. **QUALITY ASSURANCE:**

1.4.1 Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.

1.4.2 Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel," AWS D1.2 "Structural Welding Code--Aluminum," and AWS D1.3 "Structural Welding Code--Sheet Steel."

1.4.2.1 Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5. **PROJECT CONDITIONS:**

1.5.1 Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.5.1.1 Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 - PRODUCTS

2.1. **FERROUS METALS:**

2.1.1 Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.1.2 Steel Plates, Shapes, and Bars: ASTM A 36.

2.1.3 Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.

2.2. **PAINT:**

2.2.1 Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field- applied topcoats despite prolonged exposure.

2.3. **FASTENERS:**

2.3.1 General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

2.3.2 Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563, and, where indicated, flat washers.

2.3.3 Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).

2.3.4 Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).

2.3.5 Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.

2.3.6 Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.3.6.1 Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2.3.7 Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.4. **FABRICATION, GENERAL**:

2.4.1 Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. 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 each metal fabrication.

2.4.2 Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

2.4.3 Shear and punch metals cleanly and accurately. Remove burrs.

2.4.4 Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

2.4.6 Remove sharp or rough areas on exposed traffic surfaces.

2.4.7 Weld corners and seams continuously to comply with the following:

2.4.7.1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2.4.7.2 Obtain fusion without undercut or overlap.

2.4.7.3 Remove welding flux immediately.

2.4.7.4 At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

2.4.8 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. Locate joints where least conspicuous.

2.4.9 Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.4.10 Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.4.11 Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

2.4.12 Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.5. **ROUGH HARDWARE**:

2.5.1 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 wood framing to concrete slab foundation. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

2.5.2 Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.6 **BRICK MASONRY LINTELS:**

2.6.1 Angle and beam lintels fabricated from steel in sizes indicated on the Drawings with 8-inch minimum bearing each side, and support tubes where required.

2.6.2 Lintels to be hot-dipped galvanized after fabrication.

2.7 **LINTELS:**

2.7.1 Exterior/interior ladders fabricated from steel in sizes indicated on the Drawings with epoxy anchors and welded anchorage connections.

2.7.2 Ladder stringers to be 2-inch 3/8-inch thick steel plates with 1-inch diameter rungs spaced 12-inch on center vertically.

2.8 **ROOF BRACKETS:**

2.8.1 Roof brackets fabricated (welded, 16 ga.) hollow metal plates sizes and shapes as indicated on the Drawings.

2.8.2 Brackets to be hot-dipped galvanized after fabrication.

2.9 **PREFABRICATED BUILDING/CANOPY GUTTER DOWNSPOUT BOOTS:**

2.9.1 Downspout boots are to be furnished in two-pieces in shapes/sizes as indicated on the Drawings.

2.9.2 Downspout boots shall be pre-fabricated from cast iron.

2.9.3 Downspout boots shall be equivalent to McKinley Iron Works, Cast Iron Downspout Boots.

2.10 **BOLLARDS:**

2.10.1 Bus area loading/unloading bollards are to be fabricated (welded) from steel piping and plates in design/size as indicated on the drawings.

2.10.2 Bollards are to be hot-dipped galvanized after fabrication and then shop-painted (yellow with high-visible markings per ADA requirements).

2.11 **MISCELLANEOUS FRAMING AND SUPPORTS:**

2.11.1 Fabricated units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate 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, hangers, and similar items.

2.12 **PREFABRICATED WINDOW SILLS:**

2.12.1 Prefabricated / Prefinished (matching window finish) are to be provided at all window - profiles as shown on Drawings.

2.12.2 Thickness: 0.25-inch.

2.12.3 Sill to be anchored in place with concealed metal clips.

2.13 **STEEL AND IRON FINISHES:**

2.13.1 Apply shop primer to Uncoated surfaces of metal fabrications, except those noted to receive galvanized finishes or to be embedded in concrete, unless otherwise indicated. Comply with requirements of SSPC-PA 1 “Paint Application Specification No. 1” for shop painting.

2.13.1.1 Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1. **PREPARATION:**

3.1.1 Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2. **INSTALLATION, GENERAL:**

3.2.1 Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction.

3.2.2 Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

3.2.3 Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

3.2.4 Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot- dip galvanized after fabrication and are intended for bolted or screwed field connections.

3.3 **ADJUSTING AND CLEANING:**

3.3.1 Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting."

END OF SECTION 05500

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.2 **RELATED DOCUMENTS:**

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

1.2 **DESCRIPTION OF WORK:**

1.2.1 Definition: Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated. Types of work included in this section as follows:

1.2.1.1 Miscellaneous metal framed wall/partition wood blocking.

1.2.1.2 Wall mounted plywood

1.2.1.3 Roof plywood sheathing and miscellaneous blocking

1.2.1.4 Roof cricket.

1.2.4.5 Fiber cement roof eave fascia.

1.2.2 Related Sections:

1.2.2.1 The following Sections contain requirements that relate to this Section:

1.2.2.1.1 Division 6 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.

1.3 **SUBMITTALS:**

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product Data for the following products:

Engineered wood products.
Metal framing anchors.
Construction adhesives.

1.3.3 Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee's (ALSC) Board of Review.

1.3.4 Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:

1.3.4.1 For each type of preservative-treated wood products, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.

1.3.4.2 For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.

1.3.5 Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

1.3.6 Warranty of chemical treatment manufacturer for each type of treatment.

1.3.7 Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence the following products' compliance with building code in effect for Project.

Engineered wood products.
Metal framing anchors.
Power-driven fasteners.

1.4 **QUALITY ASSURANCE:**

1.4.1 Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency- submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

1.5 **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.

1.5.2 For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS:**

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

2.1.1.1 Wood-Preservative-Treated Materials:

Baxter: J. H. Baxter Co.
Chemical Specialties, Inc.
Continental Wood Preservers, Inc.
Hickson Corp.
Hoover Treated Wood Products, Inc.
Osmose Wood Preserving, Inc.

2.1.1.2 Laminated-Veneer Lumber:

Alpine Structures.
Boise Cascade Corp.
Georgia-Pacific Corp.
Louisiana-Pacific Corp.
Trus Joist MacMillan.
Willamette Industries, Inc.

2.1.1.3 Metal Framing Anchors:

Cleveland Steel Specialty Co.
Harlen Metal Products, Inc.
Silver Metal Products, Inc.
Simpson Strong-Tie Company, Inc.
Southeastern Metals Manufacturing Co., Inc.

2.2 **LUMBER, GENERAL:**

2.2.1 Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

2.2.2 Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:

NELMA - Northeastern Lumber Manufacturers Association.
NLGA - National Lumber Grades Authority (Canadian).
SPIB - Southern Pine Inspection Bureau.
WCLIB - West Coast Lumber Inspection Bureau.
WWPA - Western Wood Products Association.

2.2.3 Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

2.2.4 Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

2.3 **WOOD-PRESERVATIVE-TREATED MATERIALS:**

2.3.1 General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

2.3.2 Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

2.3.2.1 Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2.3.2.2 Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3.2.3 Wood floor plates installed over concrete slabs directly in contact with earth.

2.3.3 Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft.

2.3.3.1 Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.4 **DIMENSION LUMBER:**

2.4.1 General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.

2.4.1.1 Species: Spruce Pine FIC; SPF

2.4.2 Other Framing Not Listed Above: Provide the following grades and species:

2.4.2.1 Grade: No. 2.

2.4.2.2 Species: Southern Pine; SPIB.

2.5 **MISCELLANEOUS LUMBER:**

2.5.1 General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

2.5.2 Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

2.5.3 Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

2.5.4 Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

2.6 **WOOD-BASED STRUCTURAL-USE PANELS, GENERAL:**

2.6.1 Structural-Use Panel Standards: Provide either all- veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.

2.6.2 Trademark: Factory mark structural-use panels with APA trademark evidencing compliance with grade requirements.

2.7. **FASTENERS:**

2.7.1 General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

2.7.1.2 Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.

2.7.2 Nails, Wire, Brads, and Staples: FS FF-N-105.

2.7.3 Power-Driven Fasteners: CABO NER-272.

2.7.4 Wood Screws: ASME B18.6.1.

2.7.5 Lag Bolts: ASME B18.2.1.

2.7.6 Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 **INSTALLATION, GENERAL:**

3.1.1 Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

3.1.2 Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

3.1.3 Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

3.1.4 Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

3.1.5 Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

3.1.5.1 CABO NER-272 for power-driven staples, P-nails, and allied fasteners.

3.1.5.2 Published requirements of metal framing anchor manufacturer.

3.1.5.3 "Table 2305.2--Fastening Schedule" of the BOCA National Building Code.

3.1.6 Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

3.1.7 Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.

3.1.8 Countersink nail heads on exposed carpentry work and fill holes with wood filler.

3.2 **MISCELLANEOUS WOOD BLOCKING:**

3.2.1 Install wood blocking where shown and where required for attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.

3.2.2 Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

3.2.3 Install permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 **STRUCTURAL-USE PANELS:**

3.3.1 General: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.

3.3.1.1 Comply with "Code Plus" provisions of above-referenced guide.

3.3.2 Fastening Methods: Fasten panels as indicated below:

3.4 **WALL/PARTITION BLOCKING:**

3.4.1 Install wall/partition treated (fire-retardant plywood) blocking as required for anchorage of toilet accessories and other wall mounted equipment.

3.4.2 Anchor plywood blocking securely between metal wall/partition furring.

3.4.3 Coordinate location/height of all wall mounted TV locations with Owner prior to installation.

3.5 **WALL MOUNTED PLYWOOD:**

3.5.1 Install wall mounted plywood as indicated on Drawings.

3.5.2 Anchor plywood securely to wall framing at 24” on center.

3.6 **PLYWOOD ROOF SHEATHING/BLOCKING:**

3.6.1 Install ¾” thick structural grade tongue and groove treated (fire-retardant) plywood roof sheathing and miscellaneous blocking as indicated on Drawings.

3.6.2 Anchor plywood securely to structural metal roof decking at 24” on center with 3-inch galvanized roof screws.

3.7 **ROOF CRICKET:**

3.7.1 Install roof cricket framing/plywood as indicated on Drawings.

3.7.2 Anchor /nail framing securely to plywood roof decking and cover with treated plywood.

3.8 **FASCIA BOARD:**

3.8.1 Install fiber cement fascia boards as indicated on the Drawings.

3.8.2 Provide minimum 12-foot boards with glued scarf joints.

3.8.3 Anchor fascia boards securely to wood blocking 24” o.c. staggered with 3-inch galvanized screws counter sunk and plugged.

END OF SECTION 06100

SECTION 06160 - SHEATHING

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1. This Section includes the following:

1.2.1.1. Wall insulation sheathing.

1.2.1.2. Stucco Sheathing.

1.2.2. Related Sections include the following:

1.2.2.1. Division 5 Section "Cold-Formed Metal Framing" for plywood backing panels.

1.2.3 Division 9 Section “Stucco” for exterior wall stucco.

1.3 **SUBMITTALS**

1.3.1. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 **QUALITY ASSURANCE**

1.4.1. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.4.1.1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

1.4.2. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1.4.2.1. Plywood.

1.5 **DELIVERY, STORAGE, AND HANDLING**

1.5.1. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 **WALL SHEATHING**

2.1.1. Insulated Sheathing.

2.1.1.1. Manufacturers: Subject to compliance with requirements, provide equivalent products by:

2.1.1.1.1. Thermax as manufactured by Dow Chemical Company.

2.1.2. Type and Thickness: 1-inch thick.

2.1.3. Edge and End Configuration: Square ends.

2.1.4. Size: 24 by 96 inches for horizontal installation.

2.2 **STUCCO SHEATHING**

2.2.1 Equivalent to Georgia Pacific “Densglass” fiber faced sheathing.

2.2.2 5/8-inch thick

2.3 **VAPOR BARRIER**

2.3.1 Equivalent to “Air Shield” fluid applied by W R Meadows.

2.3.2 Joint filler and spray applied membrane.

2.4 **FASTENERS**

2.4.1. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

2.4.1.1. For roof sheathing, provide fasteners of Type 304 stainless steel.

2.4.2. Nails, Brads, and Staples: ASTM F 1667.

2.4.3. Power-Driven Fasteners: NES NER-272.

2.4.4. Wood Screws: ASME B18.6.1.

2.4.5. Screws for Fastening Insulated Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

2.4.5.1. For steel framing from 0.033 to 0.112-inch thick, attach sheathing to comply with ASTM C 954.

2.5. **SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS**

2.5.1. Sealant for Insulated Sheathing tape with adhesive backing recommended by sheathing manufacturer for application indicated.

PART 3 - EXECUTION

3.1 **INSTALLATION, GENERAL**

3.1.1. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

3.1.2. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

3.1.3. Securely attach to substrate by fastening as indicated, complying with the following:

3.1.3.1. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

3.1.4. Use screws unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

3.1.5. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 **INSULATION WALL SHEATHING INSTALLATION**

3.2.1. Comply with manufacturer's written instructions.

3.2.1.1. Fasten sheathing to cold-formed metal framing with screws.

3.2.1.2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.

3.2.1.3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

3.2.2. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.

3.2.3. Horizontal Installation: Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

3.2.3.1 Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

3.3. **STUCCO SHEATHING/VAPOR BARRIER INSTALLATION**

3.3.1. Comply with manufacturer's written instructions.

3.3.1.1 Fasten sheathing to cold form metal framing through insulated wall sheathing with screws.

3.3.1.2 Install boards with a 3/8-inch gap.

3.3.1.3 Fill joints with manufacturer approved joint filler.

3.3.1.4 Apply (spray) liquid membrane vapor barrier with initial coating over all filled joints then over entire sheathing.

END OF SECTION 06160

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes the following casework:

1.2.1.1 Miscellaneous Doors/Openings: Stained wood frame/casing surrounds with engraved signage/lettering.

1.2.1.2 Stained wood framing/paneling along with operable service shutters including glazing as indicated on Drawings at Transit/Operations Wing Ticketing #105/#105A.

1.2.1.3 Stained wood wall paneling as indicated on Drawings at Transit/Operations Wing Waiting/Ticketing #104, Vending #104A and Transportation/ Administration Wing Public Meeting #112.

1.2.1.4 Stained wood cabinets (lower) in Transportation/Administration Wing Public Meeting #112.

1.2.1.5 Cabinets (upper/lower) in Transit/Operation Wing Ticketing #105/#105A, Break Area #109, Military Hospitality #106 and Transportation/Administration Wing Document Center #115, Prep Area #116A.

12.1.6 Solid-surface countertops (with integral sink) and backsplashes.

1.2.1.7 Solid-surface window stools.

1.2.1.8. Miscellaneous shelving.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 6 Section "Rough Carpentry" for blocking and other carpentry work concealed in the wall.

1.2.2.2 Division 11 Section “Residential Appliances” for appliances mounted in casework.

1.2.2.3 Division 15 Section “Plumbing Fixtures” for sink units mounted in countertops.

1.3. **DEFINITIONS**:

1.3.1 Exposed Surfaces: Surfaces visible when drawers and opaque doors are closed; behind clear glass doors; bottoms of millwork 43 inches or more above finished floor.

1.3.2 Semi-Exposed Surfaces: Surfaces which become visible when opaque doors are open or drawers are extended; bottoms of millwork are more than 30 inches and less than 42 inches above finished floor.

1.3.3 Concealed Surfaces: Surfaces considered concealed when surfaces not visible after installation; bottoms of millwork less than 30 inches above finished floor; tops of millwork over 78 inches above finished floor and not visible from an upper level; stretchers, blocking, and components concealed by drawers.

1.3.4 Flush Overlay: Door and drawer faces cover cabinet frame with space between faces sufficient for operating clearance.

1.4. **SUBMITTALS:**

1.4.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.4.2 Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

1.4.3 Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1.4.3.1 Show details full size.

1.4.4 Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1.4.4.1 Wood surround including sample of lettering.

1.4.4.2 Wood stains for wall paneling and cabinets.

1.4.4.3 Solid Surface for countertops/back and side splashes.

1.4.4.4 Solid Surface for window stools.

1.4.4.5 Plastic laminate for cabinets (upper/lower).

1.4.5 Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5. **QUALITY ASSURANCE:**

1.5.1 Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

1.5.2 Single-Source Responsibility: Arrange for production of interior architectural woodwork with sequence-matched wood veneers by a single firm.

1.5.3 Quality Standard: Except as otherwise indicated, comply with the following standard:

1.5.3.1 AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.

1.6. **DELIVERY, STORAGE, AND HANDLING:**

1.6.1 Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

1.6.2 Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.7. **PROJECT CONDITIONS:**

1.7.1 Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7.2 Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7.2.1 Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.

1.8. **COORDINATION:**

1.8.1 Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1. **MATERIALS:**

2.1.1 General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

2.1.1.1 Select Clear, Red Oak.

2.1.1.2 Softwood Plywood: PS 1.

2.1.1.3 Solid Surface for Countertops: Corian (Group 5) or Equivalent.

2.1.1.4 Solid Surface for Window Stools: Corian (Group 5) or Equivalent

2.1.1.5 Plastic Laminate.

2.2 **INSTALLATION MATERIALS:**

2.2.1 Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

2.2.2 Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

2.3 **SURROUNDS/WALL PANELING:**

2.3.1 Surrounds shall be constructed of wood sizes/shapes as indicated on the drawings.

2.3.2 Wall Paneling shall be constructed of ¾" plywood veneer matching surround wood.

2.3.3 Surrounds/Wall paneling shall be shop stained, sealed finish coat before delivery to site.

2.3.3.1 Stain to be selected by Architect.

2.3.3.2 Sample of stain and sealer and finish shall be approved by Architect prior to overall finishing.

2.4. **PLASTIC LAMINATE FACE CASEWORK**:

2.4.1 Face Style: Flush overlay.

2.4.2 Face Frame: 1-by-1-5/8-inch solid wood frame rails and stiles with glued mortise and tenon joints.

2.4.3 Concealed Surfaces: Sound and dry solid wood, plywood, or particleboard without defects affecting strength, utility, or stability.

2.4.4 Sides, Dividers, Tops, Bottoms, Shelves, and Stretchers: Plastic laminate GP 28 on 1/2-inch thick particleboard. Provide stretchers for top of base cabinet.

2.4.5 Back Panels: 1/8-inch thick hardboard with thermoset decorative panels on interior surfaces fastened to rear edge of end panels and to top and bottom rails.

2.4.6 Exposed Edge Treatment: Edge doors and drawer fronts with plastic laminate of same material as exposed faces.

2.4.7 Semi-Exposed Edge Treatment: Edge top of drawer body with high-impact plastic tee edging. Edge remaining casework surfaces with plastic laminate GP 28 matching adjoining plastic laminate in color, pattern, and finish.

2.4.8 Doors, Drawer Fronts, Fixed Panels, Toeboards, and Ends: Plastic laminate GP 28 on 5/8-inch thick particleboard.

2.4.9 Drawers: Fabricate with front, bottom, and back rabbeted in sides and secured with glue and mechanical fasteners as follows:

2.4.9.1 Subfronts, Sides, and Backs: 3/8-inch thick particleboard.

2.4.9.2 Bottoms: Not less than 1/4-inch thick particleboard.

2.4.9.3 Drawer Suspension: Provide for a minimum capacity of 50 lbs, with twin-track, side-mounted, drawer-glide suspension with nylon rollers. Provide self-closing feature and positive stop.

2.4.10 Joinery: Rabbet backs flush into end panels and secure with concealed mechanical fasteners. Connect tops and bottoms of wall cabinets and bottoms and stretchers of base cabinets to ends and dividers with mechanical fasteners. Rabbet tops, bottoms, and backs into end panels.

2.4.11 Toe Board: 5/8-inch thick particleboard attached to subbase with concealed fasteners.

2.5. **SOLID-SURFACE COUNTERTOPS**:

2.5.1 Configuration: Provide countertops with the following front and backsplash style:

2.5.1.1 Front: Radius edge with 3/8-inch radius.

2.5.1.2 Backsplash: Radius edge with 3/8-inch radius.

2.5.1.3 Endsplash: Match backsplash.

2.5.2 Countertops: 1-inch thick, solid surfacing material with front edge built of same material.

2.5.3 Backsplash: 1/2-inch thick, solid surfacing material.

2.5.4 Fabrication: Fabricate tops in one piece with shop applied edges, unless otherwise noted. Comply with solid-surfacing-material manufacturer's written instructions for adhesives, sealers, fabrication and finishing.

2.6 **SOLID-SURFACE WINDOW STOOLS**:

2.6.1 Configuration: Provide window stools with the following style:

2.6.1.1 Material Thickness: 1-1/2 inches.

2.6.1.2 Exposed edges with a bullnose edge of 3/8" radius.

2.6.2 Fabrication: Fabricate tops in one piece with integral edges, unless otherwise noted. Comply with solid-surfacing-material manufacturer's written instructions for adhesives, sealers, fabrication and finishing.

2.6 **SHELVING**

2.6.1. Shelving to be constructed with two (2) adhered plies of 3/4" plywood with a painted 1x2 birch edge.

PART 3 - EXECUTION

3.1. **PREPARATION:**

3.1.1 Condition woodwork to average prevailing humidity conditions in installation areas before installing.

3.1.2 Before installing architectural woodwork, examine shop- fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2. **INSTALLATION:**

3.2.1 Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

3.3 **ADJUSTING AND CLEANING:**

3.3.1 Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

3.3.3 Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 **PROTECTION:**

3.4.1 Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 06402

SECTION 07115 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1. This Section includes cold-applied, cut-back asphalt dampproofing applied to the following surfaces:

1.2.1.1. Interior side of exterior masonry dumpster screen wall, low-height/planter walls, and monument signs.

1.3 **SUBMITTALS**

1.3.1. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

1.3.2. Material Certificates: For each product, signed by manufacturers.

1.4 **QUALITY ASSURANCE**

1.4.1. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.5 **PROJECT CONDITIONS**

1.5.1. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

1.5.2. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.1.1. 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:

2.1.2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.1.2.1. Cold-Applied, Emulsified-Asphalt Dampproofing:

a. Euclid Chemical Company (The).
b. Karnak Corporation.
c. Koppers Industries, Inc.
d. Meadows, W. R., Inc.
e. Sonneborn, Div. of ChemRex, Inc.

2.1.2.2. Protection Course, Asphalt-Board Type:

a. Grace, W. R. & Co.; Construction Products Div.
b. Meadows, W. R., Inc.
c. Sonneborn, Div. of ChemRex, Inc.

2.2 MISCELLANEOUS MATERIALS

2.2.1. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

2.2.2. Corner Reinforcing: Provide 24-inch wide fiber mesh corner reinforcing.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.

3.1.1.1. Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.2.1. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

3.2.2. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

3.3 APPLICATION, GENERAL

3.3.1. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

3.3.1.1. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.

3.3.1.2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.

3.3.2. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior whether indicated or not.

3.3.2.1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.

3.3.2.2. Extend 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

3.3.2.3. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat required for embedding fabric is in addition to other coats required.

3.4 **COLD-APPLIED, CUT-BACK ASPHALT DAMPPROOFING**

3.4.1. Apply primer and two brush or spray coats at not less than 1.25 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat, or primer and one trowel coat at not less than 4 gal./100 sq. ft.

3.5 **CLEANING**

3.5.1. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 07115

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS**:

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

1.2. **SUMMARY**:

1.2.1 This Section includes the following:

1.2.1.1 Insulation under slabs-on-grade.

1.2.1.2 Concealed building insulation.

1.2.1.3. Concealed entry tower insulation.

1.2.1.4 Acoustical wall panels.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 1 Section “Alternates” for building roof insulation alternate.

1.2.2.2 Division 5 Section "Cold-Formed Metal Framing" for exterior wall framing.

1.3. **SUBMITTALS**:

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product Data for each type of insulation product specified.

1.4. **QUALITY ASSURANCE**:

1.4.1 Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

1.4.2 Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.4.2.1 Surface-Burning Characteristics: ASTM E 84.

1.4.2.2 Fire-Resistance Ratings: ASTM E 119.

1.5. **DELIVERY, STORAGE, AND HANDLING**:

1.5.1 Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.5.2 Protect plastic insulation as follows:

1.5.2.1 Do not expose to sunlight, except to extent necessary for period of installation and concealment.

1.5.3 Protect acoustical panels as follows:

1.5.3.1 Store unopened bundles in a temperature-controlled dry place with adequate air circulation.

1.5.3.2 Protect panel edges from crushing and impact.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS**:

2.1.1 Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

2.1.1.1 Extruded-Polystyrene Board Insulation:

Amoco Foam Products Company.
DiversiFoam Products.
Dow Chemical Co.

2.1.1.2 Glass-Fiber Insulation:

CertainTeed Corporation.
Knauf Fiber Glass GmbH.
Owens-Corning Fiberglas Corporation.

2.1.1.3 Acoustical Wall Panels: Novawall or equivalent.

2.2. **INSULATING MATERIALS**:

2.2.1 General: Provide insulating materials that comply with requirements and with referenced standards.

2.2.1.1 Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

2.2.2 Extruded-Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed from polystyrene base resin by an extrusion process using hydrochlorofluorocarbons as blowing agent to comply with ASTM C 578 for type and with other requirements indicated below:

2.2.2.1 Type IV, 1.60-lb/cu. ft. minimum density, unless otherwise indicated.

2.2.2.2 Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 75 and 450, respectively.

2.2.3 Unfaced Mineral-Fiber Blanket Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C665, Type I (blankets without membrane facing).

2.2.3.1 Mineral-Fiber Type: Fibers manufactured from fiberglass.

2.2.3.2 Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 50, respectively.

2.2.3.3 Surface-Burning Characteristics: Smoke-developed indices of 25 and 50, respectively.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **PREPARATION**:

3.2.1 Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or that interfere with insulation attachment.

3.3. **INSTALLATION, GENERAL**:

3.3.1 Comply with insulation manufacturer's written instructions applicable to products and application indicated.

3.3.2 Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to ice and snow.

3.3.3 Extend insulation in thickness indicated to envelope entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

3.3.4 Apply single layer of insulation to produce thickness indicated.

3.4. **INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION**:

3.4.1 On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

3.4.2 Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to written instructions of insulation manufacturer.

3.5. **INSTALLATION OF GENERAL BUILDING INSULATION**:

3.5.1 Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.5.2 Install glass-fiber blankets in cavities formed by framing members according to the following requirements:

3.5.2.1 Walls: Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

3.5.2.2 Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3.5.2.3 Attic: Place loose-fill insulation into space and onto surfaces as shown; either by pouring or by machine blowing to comply with ASTM C1015. Lever horizontal applications to uniform thickness as indicated lightly settle to uniform density, but do not compact excessively.

3.6. **INSTALLATION OF ACOUSTICAL WALL PANELS**:

3.6.1 Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges lever and in alignment with other panels, faces, flush and scribed to fit adjoining work accurately at borders and penetrations. Coordinate with installation details as indicated in drawings.

3.6.2 Comply with acoustical wall panel manufacturer's written instruction for installation of panels using type of concealed mounting accessories as recommended by manufacturer. Anchor panels securely to supporting substrate.

3.7 **PROTECTION**:

3.7.1 General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.7.2 Acoustical Wall Panels: Provide final protection and maintain conditions, as recommended by manufacturer to ensure panels are without damage or deterioration.

3.7.2.1 Replace acoustical wall panels that cannot be cleaned and/or repaired.

END OF SECTION 07210

SECTION 07211 - FOAMED-IN-PLACE INSULATION (ALTERNATE NO. THREE)

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS:**

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 **SUMMARY:**

1.2.1 Section Includes:

1.2.1.1 Two-component closed-cell spray polyurethane foam at underside of all roof decking as indicated on the drawings.

1.2.2 Related Requirements:

1.2.2.1 Section 01230 “Alternates” for foamed-in place insulation alternate.

1.2.2.2 Section 07210 "Building Insulation" for fiberglass insulation batts.

1.2.2.3 Section 07920 “Joint Sealants” for spray polyurethane foam insulation installed as part of a barrier system.

1.3 **SUBMITTALS:**

1.3.1 Product Data: For closed-cell spray polyurethane insulation product.

1.3.2 Qualification Data: For spray-foam Installer.

1.3.3 Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.3.4 Evaluation Reports: For spray-applied polyurethane foam-plastic insulation.

1.4 **QUALITY ASSURANCE:**

1.4.1 Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.4.2 Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.4.3 Fire Resistance Characteristics: As determined by testing identical products (based on a 4-inch minimum thickness) according to ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.4.4 Fire Resistance Characteristics: As determined by testing identical products according to NFPA 285 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Protect spray polyurethane foam components as follows:

1.5.1.1 Component A and B: store between 60 degrees F and 90 degrees F.

1.5.1.2 Component B: mix thoroughly prior to use.

1.5.1.3 Components should be a matched set (system) as supplied by the manufacturer.

1.5.1.4 Use components within their labeled shelf-life.

1.5.1.5 Use components as supplied with no site alterations or additions.

1.6 **WARRANTY:**

1.6.1 Manufacturer's standard warranty

PART 2 – PRODUCTS

2.1 **CLOSED-CELL SPRAY POLYURETHANE FOAM:**

2.1.1 Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

2.1.1.1 BASF Corporation/Walltite US Series.

2.1.1.2 Demilec/Heatlok XT.

2.1.1.3 NCFI Polyurethanes/Insulbloc.

2.1.2 Physical Properties:

2.1.2.1 Free Rise Core Density: ASTM D1622, 2.0 pcf.

2.1.2.2 Compressive Strength: ASTM D1621, 27 psi.

2.1.2.3 Moisture Vapor Transmission: ASTM E96, 1.3 perm-in.

2.1.2.4 Closed Cell Content: ASTM D6226, >90%

2.1.2.5 Minimum 6.0 R-value @ 1": ASTM C518

2.1.2.6 Air Permeance @ 1": Infiltration ASTM E283 and 2178 Exfiltration, 0.000 cfm/sq. ft. @ 1.57 psf, 0.000 cfm/sq. ft. @ 1.57 psf.

2.1.2.7 Bacterial and Fungal Growth: ASTM G21 and E1428, Negligible

2.1.2.8 STC: ASTM E90, 31 / OITC: ASTM E90, 24

2.1.2.9 Flammability: ASTM E84 @ 4 inches, Flame Spread ≤ 25, Smoke Dev ≤ 450.

2.2 **MISCELLANEOUS MATERIALS:**

2.2.1 Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

PART 3 – EXECUTIO

3.1 **PREPARATION:**

3.1.1 Verify that substrates are clean, dry, and free of substances that are harmful to insulation.

3.1.2 Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.2 **INSTALLATION:**

3.2.1 Comply with insulation manufacturer's written instructions applicable to products and applications.

3.2.2 Spray insulation to envelop entire area to be insulated and fill voids.

3.2.3 Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

3.2.4 Do not apply insulation within 3-inches of heat emitting devices or where the temperature is in excess of 200 degrees F, as per ASTM C411 or in accordance with applicable codes.

3.2.5 Wall Construction: Install 3-inch thickness into cavities formed by interior framing members indicated on Drawings.

3.2.6 Apply according to manufacturer's written instructions.

3.2.6.1 Roof Construction: Install minimum 6 1/2-inch thickness (R-38) on underside of metal roof decking as indicated on Drawings.

3.3 **PROTECTION:**

3.3.1 Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

3.3.2 Thermal Protection: Protect installed spray polyurethane foam insulation with qualified thermal or ignition barrier per applicable building codes.

END OF SECTION 072119

SECTION 07270 - FIRESTOPPING

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes firestopping for the following:

1.2.1.1 Penetrations through roof construction including openings containing cables, ducts, conduits, and other penetrating items.

1.2.1.2 Penetrations through walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

1.2.1.3 Penetrations through construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 7 Section "Joint Sealants" for non-fire- resistive-rated joint sealants.

1.2.2.2 Division 9 Section "Gypsum Assemblies" for wall/partition and ceiling surface finish.

1.2.2.3 Division 15 Sections specifying plumbing and mechanical penetrations.

1.2.2.4 Division 16 Sections specifying cable and conduit penetrations.

1.3. **SYSTEM PERFORMANCE REQUIREMENTS:**

1.3.1 General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

1.3.1.1 Where firestop systems protect penetrations located outside of wall cavities.

1.3.1.2 Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.

1.3.1.3 Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

1.3.1.4 Where firestop systems protect penetrating items larger than a 4-inch diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

1.3.2 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

1.3.3 For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

1.3.3.1 For piping penetrations for plumbing, provide moisture-resistant through-penetration firestop systems.

1.3.3.2 For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.3.4 For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

1.4. **SUBMITTALS:**

1.4.1 General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

1.4.2 Product data for each type of product specified.

1.4.2.1 Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

1.4.3 Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.

1.4.4 Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

1.4.5 Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.5. **QUALITY ASSURANCE:**

1.5.1 Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:

1.5.1.1 Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.

1.5.1.2 Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.

1.5.2 Installer Qualifications: Engage an experienced Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully.

1.5.3 Single-Source Responsibility: Obtain through penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.

1.5.4 Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

1.5.5 Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through- penetration firestop systems are installed per specified requirements.

1.6. **DELIVERY, STORAGE, AND HANDLING:**

1.6.1 Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

1.6.2 Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7. **PROJECT CONDITIONS:**

1.7.1 Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

1.7.2 Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

PART 2 - PRODUCTS

2.1. **FIRESTOPPING, GENERAL:**

2.1.1 Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

2.1.2 Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire- resistance-rated systems. Accessories include but are not limited to the following items:

2.1.2.1 Permanent forming/damming/backing materials including the following:

2.1.2.1.1 Semirefractory fiber (mineral wool) insulation.

2.1.2.1.2 Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.

2.1.2.1.3 Joint fillers for joint sealants.

2.1.2.2 Temporary forming materials.

2.1.2.3 Substrate primers.

2.1.2.4 Collars.

2.1.2.5 Steel sleeves.

2.1.3 Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

2.2. **FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS:**

2.2.1 Intumescent, Latex Sealant: Single component, intumescent, latex formulation.

2.2.2 Intumescent Putty: Nonhardening, dielectric, water- resistant putty containing no solvents, inorganic fibers, or silicone compounds.

2.2.3 Job-Mixed Vinyl Compound: Prepackaged vinyl based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame- spread and smoke-developed ratings of zero per ASTM E 84.

2.2.4 Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:

2.2.4.1 Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/ gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.2.4.2 Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.

2.2.4.3 Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.

2.2.5 Solvent-Release-Curing Intumescent Sealant: Solvent- release-curing, single-component, synthetic-polymer-based sealant of grade indicated below:

2.2.5.1 Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/ gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.2.5.1.1 Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.

2.2.5.1.2 Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.

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

2.2.5.1 Intumescent Latex Sealant:

Metacaulk 950, The RectorSeal Corporation.
Fire Barrier CP 25WB Caulk, 3M Fire Protection Products.

2.2.5.2 Intumescent Putty:

Pensil 500 Intumescent Putty, General Electric Co.
Flame-Safe FSP1000 Putty, International Protective Coatings Corp.
Fire Barrier Moldable Putty, 3M Fire Protection Products.

2.2.5.3 Job-Mixed Vinyl Compound:

USG Firecode Compound, United States Gypsum Co.

2.2.5.4 Silicone Sealants:

Dow Corning Firestop Sealant 2000, Dow Corning Corp.
Dow Corning Firestop Sealant SL 2003, Dow Corning Corp.
Pensil 100 Firestop Sealant, General Electric Co.
CS240 Firestop Sealant, Hilti Construction Chemicals, Inc.
Metacaulk 835, The RectorSeal Corporation.
Metacaulk 880, The RectorSeal Corporation.
Fyre-Sil, Tremco Inc.
Fyre-Sil S/L, Tremco Inc.

2.2.5.5 Solvent-Release-Curing Intumescent Sealants:

Biostop 500 Intumescent Firestop Caulk, Bio Fireshield, Inc.
Fire Barrier CP 25N/S Caulk, 3M Fire Protection Products.
Fire Barrier CP 25S/L Caulk, 3M Fire Protection Products.

2.3. **FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS:**

2.3.1 Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

2.3.2 Sealant Colors: Provide color of exposed joint sealants to comply with the following:

2.3.2.1 Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

2.3.3 Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

2.3.3.1 Additional Movement Capability: Provide sealant with the capability to withstand the following percentage changes in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:

2.3.3.1.1 50 percent movement in both extension and compression for a total of 100 percent movement.

2.3.4 Multicomponent, Nonsag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint- substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

2.3.4.1 Additional Movement Capability: Provide sealant with the capability to withstand the following percentage change in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:

2.3.4.1.1 50 percent movement in both extension and compression for a total of 100 percent movement.

2.3.5 Single-Component, Nonsag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

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

2.3.6.1 Single-Component, Neutral-Curing, Silicone Sealant:

Dow Corning 790, Dow Corning Corp.
Dow Corning 795, Dow Corning Corp.
Silpruf, General Electric Co.
Ultraglaze, General Electric Co.
864, Pecora Corp.

2.3.6.2 Multicomponent, Nonsag, Urethane Sealant:

Vulkem 922, Mameco International Inc.
Dynflex, Pecora Corp.
Dynatred, Pecora Corp.
Dynatrol II, Pecora Corp.
Sikaflex 2cn NS, Sika Corp.
Sonolastic NP 2, Sonneborn Building Products Div., ChemRex Inc.
Dymeric, Tremco Inc.

2.3.6.3 Single-Component, Nonsag, Urethane Sealant:

Isoflex 880 GB, Harry S. Peterson Co., Inc.
Isoflex 881, Harry S. Peterson Co., Inc.
Vulkem 921, Mameco International Inc.
Sikaflex--15LM, Sika Corp.

2.4. **MIXING:**

2.4.1 For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **PREPARATION:**

3.2.1 Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:

3.2.1.1 Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

3.2.1.2 Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.

3.2.1.3 Remove laitance and form release agents from concrete.

3.2.2 Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.2.3 Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.3. **INSTALLING THROUGH-PENETRATION FIRESTOPS:**

3.3.1 General: Comply with the "System Performance Requirements" article in Part 1 and the through- penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

3.3.2 Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

3.3.3 Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

3.3.3.1 Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.

3.3.3.2 Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3.3.3.3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4. **INSTALLING FIRE-RESISTIVE JOINT SEALANTS:**

3.4.1 General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

3.4.2 Install joint fillers 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 that allow optimum sealant movement capability and develop fire-resistance rating required.

3.4.3 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 width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

3.4.4 Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.5. **CLEANING:**

3.5.1 Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

3.5.2 Protect firestopping 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 firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION 07270

SECTION 07311 – RECYCLED ROOF SHINGLES (ALTERNATE NO. TWO)

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **DESCRIPTION OF WORK:**

1.2.1 This Section includes all shingles for the building and bus canopy roof areas.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 5 Section "Steel Deck" for building and canopy framing.

1.2.2.2 Division 6 Section “Rough Carpentry” for canopy plywood roof.

1.2.2.3 Division 7 Section “Sheet Metal Flashing and Trim” for metal gutters and downspout work.

1.3. **SUBMITTALS:**

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product data for each type of product specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.

1.3.3 Samples for verification in the form of two (2) 2 full- size units of each type of shingle indicated showing the full range of variations expected in these characteristics.

1.4. **QUALITY ASSURANCE:**

1.4.1 Fire-Test-Response Classification: Where products with a fire-test-response classification are specified, provide Class C fire resistance shingles according to UL 790 and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify each bundle of shingles with appropriate markings indicating fire-test-response classification of applicable testing and inspecting agency.

1.4.2 Wind-Resistance-Test Characteristics: 160 mph wind resistant warranty shingles based on additional installation (nailing/adhesive) requirements, provide products identical to those tested according to ASTM D 3161 or UL 997 and passed. Identify each bundle of shingles with appropriate markings of applicable testing and inspecting agency.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.

1.5.2 Handle and store materials at Project site to prevent water damage, staining, or other physical damage. Store roll goods on end. Comply with manufacturer's recommendations for job-site storage, handling, and protection.

1.6. **PROJECT CONDITIONS:**

1.6.1 Weather Limitations: Proceed with installing shingles only when existing and forecasted weather conditions will permit work to be performed according to manufacturers' recommendations and warranty requirements, and when substrate is completely dry.

1.7. **WARRANTY:**

1.7.1 General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

1.7.2 Special Warranty: Submit a 160-mph wind written warranty signed by manufacturer agreeing to repair or replace shingles that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, deformation or deterioration of shingles beyond normal weathering.

1.7.2.1 Warranty Period: Manufacturer's standard but not less than 50 years after date of Substantial Completion.

1.8. **EXTRA MATERIALS:**

1.8.1 Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

1.8.1.1 Furnish 1 square coverage of shingles, identical to those to be installed, in unbroken bundles.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1 Manufacturer: Subject to compliance with requirements, provide shingles equivalent to the following:

2.1.1.1 EcoStar “Majestic Niagara Slate”.

2.1.1.2 Thickness: 5/8 inch.

2.1.1.3 Color to match be selected from manufacturer standards.

2.2. **SHINGLES:**

2.2.1 Colors, Blends, and Patterns: Where manufacturer's standard products are indicated, provide shingles with the following requirements:

2.2.1.1 Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.

2.2.1.2 Provide Architect's selections from manufacturer's full range of colors, textures, and patterns for shingles of type indicated.

2.2.2 Sustainable/recycled synthetic “Slate” Alternative, 12” x 22” profile, color to be selected from manufacturer’s available colors. Provide shingles with a Class C fire-test- response classification that pass the wind-resistance-test requirements of ASTM D 3161.

2.2.3 Ridge Shingles: Preformed units from same shingle material used.

2.3. **METAL TRIM AND FLASHING:**

2.3.1 Sheet Metal Materials: Furnish the following sheet metal materials:

2.3.1.1 Galvanized-Steel Sheets: ASTM A 526, G 90 hot-dip galvanized steel with coating designation according to ASTM A 525, mill phosphatized where indicated for painting.

2.3.2 Metal Drip Edge: Galvanized Steel sheet with at least a 2-inch roof deck flange and a 1-1/2-inch fascia flange with a 3/8-inch drip at lower edge. Furnish the following material in lengths of 8 or 10 feet.

2.3.2.1 Material: Galvanized steel, 20-gauge sheets.

2.3.3 Metal Flashing: Job-cut to sizes and configurations required.

2.3.3.1 Material: Galvanized steel, 20-gauge sheets.

2.4. **ACCESSORIES:**

2.4.1 Underlayment: Sheet membrane shingle underlayment (Aqua Guard) manufactured by shingle manufacturer.

2.4.1.1 36 inch wide rolls, ASTM D 1970.

2.4.2 Nails: Stainless Steel, 0.120-inch diameter barbed shank, sharp-pointed, conventional roofing nails with a minimum 3/8-inch diameter head and of sufficient length to penetrate 3/4 inch into solid decking or at least 1/8 inch through plywood sheathing.

2.4.2.1 Where nails are in contact with flashing, prevent galvanic action by providing nails made from the same metal as that of the flashing.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine substrate for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of shingles. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **PREPARATION:**

3.2.1 Clean substrates of projections and substances detrimental to application. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with noncorrosive roofing nails.

3.2.2 Coordinate installation with flashings and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof sheathing have been installed and are securely fastened against movement.

3.3. **INSTALLATION:**

3.3.1 General: Comply with manufacturer's instructions and recommendations but not less than those recommended by ARMA's "Residential Shingle Roofing Manual" or "The NRCA Steep Roofing Manual."

3.3.1.1 Fasten shingles to roof sheathing with nails.

3.3.2 Underlayment: Apply 1 layer of self-adhering underlayment horizontally over entire surface to receive asphalt shingles, lapping succeeding courses a minimum of 2 inches end laps a minimum of 4 inches, and hips and valleys a minimum of 6 inches. Fasten felt with sufficient number of roofing nails or noncorrosive staples to hold underlayment in place until shingle installation.

3.3.3 Flashing: Install metal flashing and trim as indicated and according to details and recommendations of the "Shingle Roofing" section of "The NRCA Steep Roofing Manual" and ARMA's "Residential Shingle Roofing Manual."

3.3.4 Install shingles, beginning at roof's lower edge, with a starter strip of roll roofing or inverted asphalt shingles with tabs removed. Fasten shingles in the desired weather exposure pattern; use number of fasteners per shingle as recommended by manufacturer (minimum of four per shingle). Use vertical and horizontal chalk lines to ensure straight coursing.

3.3.4.1 Cut and fit shingles at ridges, and edges to provide maximum weather protection. Provide same weather exposure at ridges as specified for roof. Lap shingles at ridges to shed water away from direction of prevailing wind.

3.3.4.2 Use fasteners at ridges of sufficient length to penetrate sheathing as specified.

3.3.4.3 Pattern: 1/2 shingle spacing offset at succeeding courses with 4-inch headlap.

3.4. **ADJUSTING:**

3.4.1 Replace any damaged materials installed under this section with new materials that meet specified requirements.

END OF SECTION 07311

SECTION 07312 - ASPHALT ROOF SHINGLES

PART 1. GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **DESCRIPTION OF WORK:**

1.2.1 This Section includes all asphalt shingles for the new building and new bus canopy roof areas.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 1 Section "Alternates" for recycled roof shingles.

1.2.2.2 Division 5 Section “Steel Deck” for building and canopy roof decking.

1.2.2.3 Division 7 Section “Asphalt Roof Shingles” for roof base bid.

1.2.2.4 Division 7 Section “Sheet Metal Flashing and Trim” for metal valley flashing, drip edges, and other sheet metal work.

1.3. **SUBMITTALS:**

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product data for each type of product specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.

1.3.3 Samples for verification in the form of two (2) 2 full- size units of each type of asphalt shingle indicated showing the full range of variations expected in these characteristics.

1.4. **QUALITY ASSURANCE:**

1.4.1 Fire-Test-Response Classification: Where products with a fire-test-response classification are specified, provide asphalt shingles identical to those tested according to ASTM E 108 or UL 790 and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify each bundle of asphalt shingles with appropriate markings indicating fire-test-response classification of applicable testing and inspecting agency.

1.4.2 Wind-Resistance-Test Characteristics: 160 mph wind resistant warranty shingles based on additional installation (nailing/adhesive) requirements, provide products identical to those tested according to ASTM D 3161 or UL 997 and passed. Identify each bundle of asphalt shingles with appropriate markings of applicable testing and inspecting agency.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.

1.5.2 Handle and store materials at Project site to prevent water damage, staining, or other physical damage. Store roll goods on end. Comply with manufacturer's recommendations for job-site storage, handling, and protection.

1.6. **PROJECT CONDITIONS:**

1.6.1 Weather Limitations: Proceed with installing asphalt shingles only when existing and forecasted weather conditions will permit work to be performed according to manufacturers' recommendations and warranty requirements, and when substrate is completely dry.

1.7. **WARRANTY:**

1.7.1 General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

1.7.2 Special Warranty: Submit a written warranty signed by manufacturer agreeing to repair or replace asphalt shingles that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, deformation or deterioration of asphalt shingles beyond normal weathering.

1.7.2.1 Warranty Period: Manufacturer's standard but not less than 30 years after date of Substantial Completion.

1.8. **EXTRA MATERIALS:**

1.8.1 Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

1.8.1.1 Furnish one (1) square coverage of asphalt shingles, identical to those to be installed, in unbroken bundles.

PART 2. PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1 Manufacturer: Subject to compliance with requirements, provide asphalt shingles produced by the following:

2.1.1.1 GAF Timberline 40 HD or equivalent by the following:

2.1.1.2 Certainteed Corp.

2.1.1.3 Owens-Corning Fiberglass Corp.

2.2. **ASPHALT SHINGLES:**

2.2.1 Colors, Blends, and Patterns: Where manufacturer's standard products are indicated, provide asphalt shingles with the following requirements:

2.2.1.1 Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.

2.2.1.2 Provide Architect's selections from manufacturer's full range of colors, textures, and patterns for asphalt shingles of type indicated.

2.2.2 Square-Tab, Fiberglass Strip Shingles: Mineral surfaced, self-sealing, 3-tab, fiberglass-based, strip asphalt shingles, complying with ASTM D 3018, Type I. Provide shingles with a Class A fire-test- response classification that pass the wind-resistance- test requirements of ASTM D 3161.

2.2.3 Hip and Ridge Shingles: Job-fabricated units cut from actual asphalt shingles used.

2.3. **METAL TRIM AND FLASHING:**

2.3.1 Sheet Metal Materials: Furnish the following sheet metal materials:

2.3.1.1 Galvanized-Steel Sheets: ASTM A 526, G 90 hot-dip galvanized steel with coating designation according to ASTM A 525, mill phosphatized where indicated for painting; 0.0217 inch thick, unless otherwise indicated.

2.3.1.1.2 Finish: Black.

2.3.2 Metal Drip Edge: Brake-formed aluminum sheet with at least a 2-inch roof deck flange and a 1-1/2-inch fascia flange with a 3/8-inch drip at lower edge. Furnish the following material in lengths of 8 or 10 feet.

2.3.2.1 Material: Aluminum sheets.

2.3.3 Metal Flashing: Job-cut to sizes and configurations required.

2.3.3.1 Material: Aluminum sheets.

2.3.4 Open-Valley Metal Flashing: Preformed, inverted "V" profile at center of valley and extending at least 9 inches in each direction from centerline of valley.

2.3.4.1 Material: Galvanized-steel sheets.

2.3.4.2 Finish: Black

2.4. **ACCESSORIES:**

2.4.1 Self-Adhering Underlayment: As indicated on Drawings.

2.4.2 Sheet membrane shingle underlayment manufactured by shingle manufacturer to prevent leaks related to ice dams and wind driven rain.

2.4.2.1 36 inch wide rolls, ASTM D 1970.

2.4.3 Nails: Aluminum or hot-dip galvanized steel, 0.120-inch diameter barbed shank, sharp-pointed, conventional roofing nails with a minimum 3/8-inch diameter head and of sufficient length to penetrate 3/4 inch into solid decking or at least 1/8 inch through plywood sheathing.

2.4.3.1 Where nails are in contact with flashing, prevent galvanic action by providing nails made from the same metal as that of the flashing.

PART 3. EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine substrate for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of asphalt shingles. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **PREPARATION:**

3.2.1 Clean substrates of projections and substances detrimental to application. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with noncorrosive roofing nails.

3.2.2 Coordinate installation with flashings and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof sheathing have been installed and are securely fastened against movement.

3.3. **INSTALLATION:**

3.3.1 General: Comply with manufacturer's instructions and recommendations but not less than those recommended by ARMA's "Residential Asphalt Roofing Manual" or "The NRCA Steep Roofing Manual."

3.3.1.1 Fasten asphalt shingles to roof sheathing with nails.

3.3.2 Self-Adhering Underlayment: Apply 1 layer of underlayment horizontally over entire surface to receive asphalt shingles, lapping succeeding courses a minimum of 2 inches end laps a minimum of 4 inches, and hips and valleys a minimum of 6 inches. Fasten with sufficient number of roofing nails or noncorrosive staples to hold underlayment in place until asphalt shingle installation.

3.3.4 Sheet membrane underlayment at roof edge and valleys: Center a 36-inch wide felt underlayment at roof edge and in valley. Secure with only enough nails to hold in place until asphalt shingles are installed.

3.3.5 Metal Open Valleys: Comply with ARMA and NRCA recommendations. Install a second felt underlayment shingle lapped at least 12 inches and sealed with plastic asphalt cement. Install a metal valley shingle lapped at least 9 inches and sealed with plastic asphalt cement.

3.3.6 Flashing: Install metal flashing and trim as indicated and according to details and recommendations of the "Asphalt Roofing" section of "The NRCA Steep Roofing Manual" and ARMA's "Residential Asphalt Roofing Manual."

3.3.7 Install asphalt shingles, beginning at roof's lower edge, with a starter strip of roll roofing or inverted asphalt shingles with tabs removed. Fasten asphalt shingles in the desired weather exposure pattern; use number of fasteners per shingle as recommended by manufacturer. Use vertical and horizontal chalk lines to ensure straight coursing.

3.3.7.1 Cut and fit asphalt shingles at valleys, ridges, and edges to provide maximum weather protection. Provide same weather exposure at ridges as specified for roof. Lap asphalt shingles at ridges to shed water away from direction of prevailing wind.

3.3.7.2 Use fasteners at ridges of sufficient length to penetrate sheathing as specified.

3.3.7.3 Pattern: 1/3 shingle spacing offset at succeeding courses.

3.3.8 Ridge Vents: Manufacturer to be Lomanco, Inc., embossed painted finish #LPR-10, color 'black'. Install ridge vents according to manufacturer's instructions.

3.4. **ADJUSTING:**

3.4.1 Replace any damaged materials installed under this section with new materials that meet specified requirements.

END OF SECTION 07312

SECTION 07531 - EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

1.2.1. This Section includes the following:

1.2.1.1. Sheet Membrane roofing system.

1.2.1.2. Roof insulation including tapered crickets.

1.2.2. Related Sections include the following:

1.2.2.1 Division 5 Section “Steel Deck” for roof decking.

1.2.2.2 Division 6 Section "Rough Carpentry" for plywood roof sheathing.

1.2.2.3. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.

1.2.2.3. Division 7 Section "Joint Sealants.

1.3 DEFINITIONS

1.3.1. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.3.2. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

1.3.3. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 **PERFORMANCE REQUIREMENTS**

1.4.1. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

1.4.2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

1.4.3. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1.4.3.1. Fire/Windstorm Classification: Class 1A- 100.

1.4.3.2. Hail Resistance: SH (Severe Hail).

1.5 **SUBMITTALS**

1.5.1. Product Data: For each type of product indicated.

1.5.2. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.

1.5.2.1. Base flashings and membrane terminations.

1.5.2.2. Tapered insulation, including slopes.

1.5.2.3. Insulation fastening patterns.

1.5.3. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

1.5.4. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1.5.4.1. Submit evidence of meeting performance requirements.

1.5.5. Qualification Data: For Installer and manufacturer.

1.5.6. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

1.5.7. Research/Evaluation Reports: For components of membrane roofing system.

1.5.8. Maintenance Data: For roofing system to include in maintenance manuals.

1.5.9. Warranties: Special warranties specified in this Section.

1.5.10. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 **QUALITY ASSURANCE**

1.6.1. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1.6.2. Manufacturer Qualifications: A qualified manufacturer that has FMG approval for membrane roofing system identical to that used for this Project.

1.6.3. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

1.6.4. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane.

1.6.5. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1.6.5.1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

1.6.5.2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.6.6. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:

1.6.6.1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

1.6.6.2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

1.6.6.3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.6.6.4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

1.6.6.5. Review structural loading limitations of roof deck during and after roofing.

1.6.6.6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

1.6.6.7. Review governing regulations and requirements for insurance and certificates if applicable.

1.6.6.8. Review temporary protection requirements for roofing system during and after installation.

1.6.6.9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

1.7.2. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1.7.2.1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

1.7.3. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.7.4. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 **PROJECT CONDITIONS**

1.8.1. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 **WARRANTY**

1.9.1. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1.9.1.1. Special warranty includes roofing membrane, base flashings, roofing accessories roof insulation fasteners walkway products and other components of membrane roofing system.

1.9.1.2. Warranty Period: Ten (10) years from date of Substantial Completion.

1.9.2. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, and walkway products, for the following warranty period:

1.9.2.1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**

2.1.1. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

2.1.1.1. Products: Subject to compliance with requirements, provide one of the products specified.

2.1.1.2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 EPDM ROOFING MEMBRANE

2.2.1. EPDM Roofing Membrane: ASTM D 4637, Type II, scrim or fabric non-reinforced uniform, flexible sheet made from EPDM, and as follows:

2.2.1.1. Manufacturers:

2.2.1.1.1. Carlisle SynTec Incorporated.

2.2.1.1.2. Firestone Building Products Company.

2.2.1.2. Thickness: 60 mils, nominal.

2.2.1.3. Exposed Face Color: White.

2.3 AUXILIARY MATERIALS

2.3.1. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

2.3.1.1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

2.3.2. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.

2.3.3. Epichlorohydrin Sheet: 60-mil- thick, unreinforced flexible sheet with the following typical properties as determined per ASTM test method indicated:

2.3.3.1. Tensile Strength: 1500 psi; ASTM D 412.

2.3.3.2. Ultimate Elongation: 200 percent; ASTM D 412.

2.3.3.3. Tear Resistance: 150 lbf/in.; ASTM D 412.

2.3.3.4. Brittleness Temperature: Minus 20 deg F; ASTM D 746.

2.3.3.5. Resistance to Ozone Aging: No cracks after 168 hours' exposure of 50 percent elongated sample at 104 deg F and 100-pphm ozone; ASTM D 1149.

2.3.3.6. Resistance to Oil Aging: 15 percent maximum mass change after 168 hours' immersion in diesel fuel No. 2 at 158 deg F; ASTM D 471.

2.3.4. Bonding Adhesive: Manufacturer's standard bonding adhesive.

2.3.5. Cold Fluid-Applied Membrane Adhesive: Manufacturer's standard cold fluid-applied bonding adhesive formulated to adhere fleece-backed roofing membrane to substrate.

2.3.6. Seaming Material: Single-component butyl splicing adhesive and splice cleaner.

2.3.7. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.

2.3.8. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

2.3.9. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

2.3.10. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

2.3.11. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.4 ROOF INSULATION

2.4.1. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

2.4.2. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.

2.4.2.1. Manufacturers:

2.4.2.1.1. Atlas Roofing Corporation.

2.4.2.1.2. Carlisle SynTec Incorporated.

2.4.2.1.3. Celotex Corporation.

2.4.2.1.4. Firestone Building Products Company.

2.4.2.1.5. Johns Manville International, Inc.

2.4.3. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.

2.4.4. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.5 INSULATION ACCESSORIES

2.5.1. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

2.5.2. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.5.3. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

2.5.4. Cover Board: Gypsum-fiber insulation board, 5/8- inch thick compatible with roofing membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

3.1.1.1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.

3.1.1.2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3.1.1.3. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.

3.1.1.4. Verify that wood substrate is visibly dry and free of moisture. Test for moisture by probe method.

3.1.1.5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **PREPARATION**

3.2.1. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

3.2.2. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.2.3. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3. **INSULATION INSTALLATION**

3.3.1. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

3.3.2. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

3.3.3. Install tapered insulation under area of roofing to conform to slopes indicated.

3.3.4. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is two (2) inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

3.3.5. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

3.3.6. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

3.3.6.1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

3.3.7. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

3.3.7.1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.

3.3.7.2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.3.8. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck.

3.3.8.1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.

3.3.8.2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.4 ADHERED ROOFING MEMBRANE INSTALLATION

3.4.1. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

3.4.2. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.

3.4.3. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

3.4.4. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

3.4.5. Cold Fluid-Applied Adhesive: Apply cold fluid-applied adhesive to substrate at rate required by manufacturer and install roofing membrane.

3.4.6. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

3.4.7. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

3.4.8. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

3.4.8.1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.

3.4.9. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

3.4.10. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.4.11. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

3.4.12. Install roofing membrane and auxiliary materials to tie into existing roofing.

3.4.13. Apply epichlorohydrin sheet over roofing membrane at locations indicated.

3.5 BASE FLASHING INSTALLATION

3.5.1. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

3.5.2. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

3.5.3. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

3.5.4. Clean splice areas apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

3.5.5. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 FIELD QUALITY CONTROL

3.6.1. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

3.6.2. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

3.6.2.1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

3.6.3. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.6.4. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 PROTECTING AND CLEANING

3.7.1. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

3.7.2. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

3.7.3. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.8 ROOFING INSTALLER'S WARRANTY

3.8.1. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

3.8.1.1. Owner: City of Jacksonville Attn: Deanna Trebil

3.8.1.2. Address: Municipal Building

3.8.1.3. Address: 1300 N. Marine Blvd / NC HWY 17, Jacksonville, North Carolina

3.8.1.4. Area of Work: <**Insert information.**>

3.8.1.5. Acceptance Date: <**Insert date.**>

3.8.1.6. Warranty Period: Thirty (30) years

3.8.1.7. Expiration Date: <**Insert date.**>

3.8.2. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

3.8.3. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

3.8.4. This Warranty is made subject to the following terms and conditions:

3.8.4.1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

3.8.4.1.1. Lightning;

3.8.4.1.2. Peak gust wind speed exceeding 140 mph;

3.8.4.1.3. Fire;

3.8.4.1.4. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

3.8.4.1.5. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

3.8.4.1.6. Vapor condensation on bottom of roofing; and

3.8.4.1.7. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

3.8.4.2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3.8.4.3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

3.8.4.4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

3.8.4.5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

3.8.4.6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

3.8.4.7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

3.8.5. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.

3.8.5.1. Authorized Signature: <**Insert signature.**>

3.8.5.2. Name: <**Insert name.**>

3.8.5.3. Title: <**Insert title.**>

END OF SECTION 07531

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS**:

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

1.2. **SUMMARY:**

1.2.1 This Section includes sheet metal flashing and trim in the following categories:

1.2.1.1 Miscellaneous metal flashing.

1.2.1.2 Building and bus canopy roof-drainage system (gutter and downspout).

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 7 Roofing Sections for “Shingles”.

1.3. **PERFORMANCE REQUIREMENTS:**

1.3.1 General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

1.4. **SUBMITTALS:**

1.4.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.4.2 Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

1.4.3 Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1.4.3.1 8-inch square Samples of specified sheet materials to be exposed as finished surfaces.

1.4.3.2 12-inch long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.

1.4.4 Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5. **QUALITY ASSURANCE:**

1.5.1 Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in- service performance.

1.5.2 Mockups: Prior to installing sheet metal flashing and trim, construct mockups indicated to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1.5.2.1 Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.

1.5.2.2 Notify Architect one week in advance of the dates and times when mockups will be constructed.

1.5.2.3 Demonstrate the proposed range of aesthetic effects and workmanship.

1.5.2.4 Construct mockup for the following type of sheet metal flashing and trim:

1.5.2.4.1 Gutters and Downspouts.

1.5.2.5 Obtain Architect's approval of mockups before start of final unit of Work.

1.5.2.5.1 Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.6. **PROJECT CONDITIONS:**

1.6.1 Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1. **METALS:**

2.1.1 Galvanized – Steel Sheets ASTM A 526, G90 hot dipped galvanized steel with coating designation according to ASTM A525, mill phosphatic where indicated for painting.

2.2. **MISCELLANEOUS MATERIALS AND ACCESSORIES:**

2.2.1 Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

2.2.2 Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

2.2.3 Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.2.4 Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.

2.2.5 Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

2.3 **FABRICATION, GENERAL:**

2.3.1 Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

2.3.2 Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

2.3.3 Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

2.3.4 Seams: Fabricate nonmoving seams in aluminum with flatlock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

2.3.5 Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

2.3.6 Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

2.3.7 Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

2.3.8 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

2.3.9 Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

2.3.9.1 Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4. **SHEET METAL FABRICATIONS:**

2.4.1 General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

2.4.2 Miscellaneous Metal Flashing:

2.4.2.1 Copper: 16 oz.

2.4.3 Gutters: Fabricate from the following material:

2.4.3.1 Galvanized Prefinished (color to be selected) Steel: 20 gauge.

2.4.4 Downspouts: Fabricate from the following material:

2.4.4.1 Galvanized Prefinished (color to be selected) Steel: 22 gauge.

PART 3 - EXECUTION

3.1 **EXAMINATION:**

3.1.1 Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

3.2.1 General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

3.2.2 Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3.2.3 Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.2.4 Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

3.2.4.1 Use joint adhesive for nonmoving joints specified not to be soldered.

3.2.5 Seams: Fabricate nonmoving seams in aluminum with flatlock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

3.2.6 Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

3.2.6.1 Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

3.2.7 Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.

3.3 **CLEANING AND PROTECTION:**

3.3.1 Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

3.3.2 Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07620

SECTION 07720 - ROOF ACCESSORIES

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1. This Section includes the following:

1.2.1.1. Roof scuttles.

1.2.2. Related Sections include the following:

1.2.2.1. Division 6 Section "Rough Carpentry" for roof framing.

1.2.2.2. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

1.3 **SUBMITTALS:**

1.3.1. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1.3.2. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.

1.3.3. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1.3.3.1. Size and location of roof accessories specified in this Section.

1.3.3.2. Method of attaching roof accessories to roof or building structure.

1.3.3.3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

1.3.4. Warranty: Special warranty specified in this Section.

1.4 **QUALITY ASSURANCE:**

1.4.1. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.5 **DELIVERY, STORAGE, AND HANDLING:**

1.5.1. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.6 **PROJECT CONDITIONS:**

1.6.1. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 **COORDINATION:**

1.7.1. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

1.8 **WARRANTY:**

1.8.1. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1.8.1.1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

1.8.1.1.1. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

1.8.1.1.2. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

1.8.1.1.3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

1.8.1.2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in other Part 2 articles.

2.2 METAL MATERIALS:

2.2.1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coated.

2.2.2. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.

2.2.2.1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coated.

2.2.2.2. Exposed Finishes: High-Performance Organic Finish (2-Coat Fluoropolymer): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

2.2.2.2.1. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements in AAMA 2604, except as modified below:

2.2.2.2.1.1. Humidity Resistance: 1000 hours.

2.3 MISCELLANEOUS MATERIALS:

2.3.1. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.

2.3.2. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

2.3.3. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

2.3.4. Elastomeric Sealant: ASTM C 920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.3.5. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.4 **ROOF SCUTTLE:**

2.4.1. Roof Scuttle: Fabricate roof scuttle with light gauge steel with integral insulated curb mounting flashing flange. Fabricate with welded or mechanically fastened and sealed corner joints.

2.4.1.1. Manufacturer:

2.4.1.1.1. Equivalent to The Bilco Company.

2.4.1.1.2 Model # F-40.

2.4.1.2. Loads: Fabricate scuttle to withstand 40-lbf/sq. ft. external and internal loads.

2.4.1.3. Framing Material: Galvanized steel sheet, 0.079 inch thick.

2.4.1.4. Fabricate units to minimum 48” width by 48” length, unless otherwise indicated.

PART 3 - EXECUTION

3.1 **EXAMINATION:**

3.1.1. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.

3.1.1.1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.

3.1.1.2. Verify dimensions of roof openings for roof accessories.

3.1.1.3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

3.2.1. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

3.2.2. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

3.2.2.1. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.

3.2.2.2. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

3.2.3. Install roof dormers level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

3.2.4. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.3 **TOUCH UP:**

3.3.1. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 9 painting Sections.

3.3.2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 **CLEANING:**

3.4.1. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07720

SECTION 07901 - JOINT SEALANTS

PART 1 - GENERAL

1.1. **SUMMARY:**

1.1.1. This Section includes joint sealants for the following locations:

1.1.1.1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:

1.1.1.2. Brick Masonry control joints.

1.1.1.3. Cast stone masonry units and brick veneer units.

1.1.1.4. Perimeter joints between metal window/doors and stucco.

1.1.1.5. Pipe and conduit penetrations.

1.1.1.6. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:

1.1.1.6.1. Perimeter joints of exterior openings where indicated.

1.1.1.6.2. Pipe and conduit penetrations.

1.1.1.6.3. Other joints as indicated.

1.2. **SYSTEM PERFORMANCE REQUIREMENTS:**

1.2.1. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

1.2.2. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.3. **SUBMITTALS:**

1.3.1. General: Submit the following in accordance with Conditions of Contract.

1.3.2. Product data from manufacturers for each joint sealant product required.

1.4. **QUALITY ASSURANCE:**

1.4.1. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

1.4.2. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

1.5.2. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6. **PROJECT CONDITIONS:**

1.6.1. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1.6.1.1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.

1.6.1.2. When joint substrates are wet.

1.6.2. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

1.6.3. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1. **MATERIALS, GENERAL:**

2.1.1. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2.1.2. Colors: Provide color of exposed joint sealants to comply with the following:

2.1.2.1. Provide selections made by the Owner and Architect from manufacturer's full range of standard colors for products of type indicated.

2.2. **ELASTOMERIC JOINT SEALANTS:**

2.2.1. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.

2.2.2. Available Products: Subject to compliance with requirements, elastomeric sealants that may be incorporated in the Work include, but are not limited to, the products specified in each Elastomeric Sealant Data Sheet.

2.2.2.1. Location: ES1 - Provide at exterior vertical surfaces sealant joints.

2.2.3 ELASTOMERIC JOINT SEALANT DATA

2.2.3.1 Elastomeric Joint Designation: ES1

2.2.3.2 Base Polymer: Neutral-curing silicone.

2.2.3.3 Type: S (single component).

2.2.3.4 Grade: NS (nonsag).

2.2.3.5 Class: 25.

2.2.3.6 Use Related to Exposure: NT (nontraffic).

2.2.3.7 Uses Related to Joint Substrates: As applicable to joint substrates indicated, O.

2.2.3.8 Use O Joint Substrates: Glass, color anodized aluminum, unit masonry, and wood.

2.2.3.9 Available Products or equal:

2.2.3.9.1 "790" Dow Corning

2.2.3.9.2 "Silpruf", GE

2.2.3.9.3 "895", Pecora Corp.

2.3. **SOLVENT-RELEASE-CURING JOINT SEALANTS:**

2.3.1. Acrylic Sealant: Manufacturer's standard one-part, nonsag, solvent-release-curing acrylic terpolymer sealant complying with AAMA 808.3 of FS TT-S-00230 or both, with capability when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the following percentage change in joint width existing at time of application and remain adhered to joint substrates indicated for Project without failing cohesively:

2.3.1.1. 12-1/2 percent movement in both extension and compression for a total of 25 percent.

2.3.2. Products: Subject to compliance with requirements, provide one of the following or equal:

2.3.2.1. Acrylic Sealant:

"PTI 738", Protective Treatments, Inc.
"PTI 767" Protective Treatment, Inc.
"Mono," Tremco, Inc.

2.3.2.2. Location: Provide at interior vertical surfaces sealant joint locations not specified to receive another type joint sealant.

2.4. **JOINT SEALANT BACKING:**

2.4.1. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2.4.2. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

2.4.2.1. Proprietary, reticulated, closed-cell polymeric foam, nonoutgassing, with a density of 2.5 pcf (40 kg/cu. m) and tensile strength of 35 psi (240 kPa) per ASTM D 1623, and with water absorption less than 0.02 g/cc per ASTM C 1083.

2.5. **MISCELLANEOUS MATERIALS:**

2.5.1. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant- substrate tests and field tests.

2.5.2. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2. **PREPARATION:**

3.2.1. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

3.2.1.1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

3.2.1.2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3.2.1.3. Clean metal, glass, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

3.2.2. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3. **INSTALLATION OF JOINT SEALANTS:**

3.3.1. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

3.3.2. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

3.3.3. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

3.3.3.1. 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 that allow optimum sealant movement capability.

3.3.3.1.1. Do not leave gaps between ends of joint fillers.

3.3.3.1.2. Do not stretch, twist, puncture, or tear joint fillers.

3.3.4. 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 that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

3.3.5. Tooling of Nonsag 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 that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.3.5.1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4. **CLEANING:**

3.4.1. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5. **PROTECTION:**

3.5.1. Protect joint sealants 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 sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION 07901

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes steel doors and frames along with glazing as indicated in the Drawings.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 8 Section "Door Hardware" for door hardware and weatherstripping.

1.2.2.2. Division 9 Section "Painting" for field painting primed doors and frames.

1.3. **SUBMITTALS:**

1.3.1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

1.3.3. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1.3.4. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

1.3.4.1. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.4. **QUALITY ASSURANCE:**

1.4.1. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

1.5.2. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.

1.5.3. Store doors and frames at building site under cover. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.1.1.1. Steel Doors and Frames:
Benchmark Commercial Door Systems
Ceco Door Products.
Republic Builders Products.
Steelcraft.

2.2. **MATERIALS:**

2.2.1 Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569.

2.2.2 Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366, commercial quality, or ASTM A 620, drawing quality, special killed.

2.2.3 Galvanized Steel Sheets: Zinc-coated carbon steel complying with ASTM A 526, commercial quality, or ASTM A 642, drawing quality, hot-dip galvanized according to ASTM A 525, with A 60 or G 60 coating designation, mill phosphatized.

2.2.4 Supports and Anchors: Fabricated from not less than 0.0478-inch thick steel sheet; 0.0516-inch thick galvanized steel where used with galvanized steel frames.

2.2.5 Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

2.3. **DOORS:**

2.3.1 Steel Doors: Provide 1-3/4-inch thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:

2.3.1.1 Interior Doors: Grade I, standard-duty, Model 2, seamless design, minimum 0.0359-inch thick cold-rolled steel sheet faces.

2.3.1.2 Exterior Doors: Grade II, heavy-duty, Model 2, seamless design, minimum 0.0516-inch thick galvanized steel sheet faces.

2.3.2 Door Louvers: Provide louvers according to SDI 111C for interior doors where indicated, with blades or baffles formed of 0.0239-inch thick cold-rolled steel sheet set into minimum 0.0359-inch thick steel frame.

2.3.2.1 Sight-Proof Louvers: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.

2.4. **FRAMES:**

2.4.1 Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 0.0478- inch thick cold-rolled steel sheet.

2.4.1.1 Fabricate frames with mitered or coped and continuously welded corners.

2.4.1.2 Form exterior frames from 0.0635-inch thick galvanized steel sheet.

2.4.2 Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single- door frames and 2 silencers on heads of double-door frames.

2.5 **GLAZING SYSTEMS:**

2.5.1. Glazing shall be 1-inch insulated units.

2.5.1.1 Glazing units shall consist of ¼-inch thick outer and inner lites with gas-filled ½-inch air space.

2.5.1.1.1 Outer glass lite shall be laminated safety glass with back coating.

2.5.1.1.2 Inner glass lite shall be clear/laminated safety glazing.

2.5.1.1.3 Glazing units shall be equivalent to PPG “Solarban 70XL” outer lite and PPG “Sungate 600” inner lite and overall thermal values of 0.28 overall U-Value and 0.23 SHGG.

2.5.2. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.

2.5.3. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.6. **FABRICATION**:

2.6.1 Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

2.6.1.1 Internal Construction: One of the following manufacturer's standard core materials according to SDI standards:

2.6.1.1.1 Vertical steel stiffeners.

2.6.1.2 Clearances: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between non-fire-rated pairs of doors. Not more than 3/4 inch at bottom.

2.6.2 Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.

2.6.3 Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

2.6.4 Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot- rolled steel sheet.

2.6.5 Galvanized Steel Doors, Panels, and Frames: For the following locations, fabricate doors, panels, and frames from galvanized steel sheet according to SDI 112. Close top and bottom edges of doors flush as an integral part of door construction or by addition of minimum 0.0635- inch thick galvanized steel channels, with channel webs placed even with top and bottom edges. Seal joints in top edges of doors against water penetration.

2.6.5.1 At exterior locations.

2.6.6 Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

2.6.7 Thermal-Rated (Insulating) Assemblies: At exterior locations provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.

2.6.7.1 Unless otherwise indicated, provide thermal-rated assemblies with U-value rating of 0.41 Btu/sq. ft. x h x deg F.

2.6.8 Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.

2.6.9 Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

2.6.10 Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2.6.11 Glazing Stops: Minimum 0.0359-inch thick steel or 0.040- inch thick aluminum.

2.6.11.1 Provide glazing frame with non-removable on exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

2.6.11.2 Provide screw-applied, removable, glazing beads on inside of glass, louvers, and other panels in doors.

2.7. **FINISHES, GENERAL:**

2.7.1 Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

2.7.2 Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes.

2.7.3 Apply primers and organic finishes to doors and frames after fabrication.

2.8. **GALVANIZED STEEL SHEET FINISHES**:

2.8.1 Surface Preparation: Clean surfaces with nonpetroleum solvent so that surfaces are free of oil or other contaminants. After cleaning, apply a conversion coating of the type suited to the organic coating applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

2.8.1.1 Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

2.8.2 Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply air-dried primer specified below immediately after cleaning and pretreatment.

2.8.2.1 Shop Primer: Zinc-dust, zinc-oxide primer paint complying with performance requirements of FS TT-P-641, Type II.

2.9. **STEEL SHEET FINISHES:**

2.9.1 Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

2.9.2 Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.

2.9.3 Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1. **INSTALLATION:**

3.1.1 General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

3.1.2 Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

3.1.2.1 In concrete masonry partitions, install at least three (3) adjustable UL-Design wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.

3.1.3 Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.

3.2. **ADJUSTING AND CLEANING:**

3.2.1 Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

3.2.2 Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08110

SECTION 08143 - STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.1 Factory finishing interior stile and rail wood doors.

1.2.1.2 Factory fitting stile and rail wood doors to frames and factory machining for hardware.

1.2.2 Related Sections include the following:

1.2.2.1 Division 06 Section "Interior Architectural Woodwork" for wood door frames and trim.

1.3 **SUBMITTALS:**

1.3.1 Product Data: For each type of door. Include details of construction and glazing.

1.3.1.1 Include factory-finishing specifications.

1.3.2 Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data, including those for stiles, rails, panels, and moldings (sticking); and other pertinent data.

1.3.2.1 Indicate dimensions and locations of mortises and holes for hardware.

1.3.2.2 Indicate doors to be factory finished and finish requirements.

1.3.3 Samples for Initial Selection: For factory-finished doors.

1.3.4 Samples for Verification: Corner sections of doors, approximately 8 by 10 inches, with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.3.5 Product Certificates: Signed by door manufacturers.

1.3.6 Warranty: Special warranty specified in this Section.

1.4 **QUALITY ASSURANCE:**

1.4.1 Source Limitations: Obtain stile and rail wood doors of special design and construction from same fabricator as work in Division 06 Section "Interior Architectural Woodwork."

1.4.2 Quality Standard for Doors of Stock Design and Construction: Comply with WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors," unless more stringent requirements are specified.

1.4.2.1 Mark, label, or otherwise identify stile and rail wood doors as complying with WDMA I.S.6, and include panel design number if applicable.

1.4.3 Quality Standard for Doors of Special Design and Construction: Comply with AWI's "Architectural Woodwork Quality Standards" unless more stringent requirements are specified.

1.4.3.1 Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

1.4.4 Forest Certification: Provide doors made from wood products obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.5 **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Comply with requirements of referenced standard and manufacturer's written instructions.

1.5.2 Package doors individually in opaque plastic bags or cardboard cartons.

1.5.3 Mark each door on top and bottom edge with opening number used on Shop Drawings.

1.6 **PROJECT CONDITIONS:**

1.6.1 Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.6.2 Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 **WARRANTY:**

1.7.1 Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, and have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.

1.7.1.1 Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

1.7.1.2 Warranty shall be in effect during the following period of time from date of Substantial Completion:

1.7.1.2.1 Interior Doors: Five years.

PART 2 – PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1 In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

2.1.1.1 Basis-of-Design Product: The design for each stile and rail door is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 **MATERIALS:**

2.2.1 General: Use only materials that comply with referenced quality standards unless more stringent requirements are specified.

2.2.1.1 Assemble interior doors, frames, and sidelites, including components, with either dry-use or wet-use adhesives complying with ASTM D 5572 for finger joints and ASTM D 5751 for joints other than finger joints.

2.2.2 Low-Emitting Materials:

2.2.2.1 Provide doors made with adhesives and composite wood products that do not contain urea-formaldehyde resins.

2.2.3 Panel Products: Any of the following:

2.2.3.1 Veneer core plywood, made with adhesive containing no urea-formaldehyde resin.

2.3 **STILE AND RAIL DOORS OF SPECIAL DESIGN AND CONSTRUCTION:**

2.3.1 Manufacturers:

2.3.1.1 Algoma Hardwoods, Inc.

2.3.1.2 Eggers Industries; Architectural Door Division.

2.3.1.3 ENJO Architectural Millwork.

2.3.1.4 Karona, Inc.

2.3.1.5 Maiman Company (The).

2.3.1.6 Oakwood Woodworks.

2.3.1.7 Pinecrest, Inc.

2.3.1.8 Select Interior Door, Ltd.

2.3.1.9 SUN-DOR-CO.

2.3.1.10 Woodtech Trading Company.

2.3.2 Construction, General:

2.3.2.1 Grade of Doors for Opaque Finish: Custom.

2.3.2.2 Wood Species and Cut for Transparent Finish: Idaho white, lodgepole, ponderosa, or sugar pine, plain sawed/sliced.

2.3.2.3 Panel Designs: Drawings indicate panel designs. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.3.3 Door Construction for Transparent Finish:

2.3.3.1 Stile and Rail Construction: Clear lumber; may be edge glued for width. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces.

2.3.3.2 Stile and Rail Construction: Veneered, structural composite lumber or veneered, edge-glued, finger-jointed clear lumber. Select veneers for similarity of grain and color, and arrange for optimum match between adjacent pieces.

2.3.3.3 Raised-Panel Construction: Clear lumber, edge glued for width. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces.

2.3.4 Interior Doors:

2.3.4.1 Stile and Rail Widths: As indicated.

2.3.4.2 Stile and Rail Widths: Manufacturer's standard, but not less than the following:

2.3.4.2.1 Stiles, Top and Intermediate Rails: 4-1/2 inches.

2.3.4.2.2 Bottom Rails: 11 3/8- inches.

2.3.4.3 Molding Profile: Manufacturer's standard.

2.3.4.4 Raised-Panel Thickness: Manufacturer's standard, but not less than 1-1/8 inches.

2.3.4.5 Flat-Panel Thickness: 1/2 inch.

2.4 **FABRICATION:**

2.4.1 Fabricate stile and rail wood doors in sizes indicated for Project-site fitting.

2.4.2 Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

2.4.2.1 Clearances: Provide 1/8 inch at heads and jambs. Provide 1/2 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 3/8 inch from bottom of door to top of threshold.

2.4.2.1.1 Comply with NFPA 80 for fire-rated doors.

2.4.2.2 Bevel non-fire-rated doors 1/8-inch in 2-inches at lock and hinge edges.

2.4.3 Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W Series standards, and hardware templates.

2.4.3.1 Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2.7 **SHOP PRIMING:**

2.7.1 Doors for Transparent Finish: Shop apply stain (if required), other required pretreatments, and first coat of finish specified in Division 09 Section "Painting" to faces and edges of doors, including mortises and cutouts.

PART 3 - EXECUTION:

3.1 **EXAMINATION:**

3.1.1 Examine doors and substrates, with Installer present, for suitable conditions where wood stile and rail doors will be installed.

3.1.1.1 Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.

3.1.1.2 Reject doors with defects.

3.1.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

3.2.1 Install fire-rated wood door frames level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

3.2.1.1 Countersink fasteners, fill surface flush, and sand smooth.

3.2.2 Hardware: For installation, see Division 08 Section "Door Hardware."

3.2.3 Install wood doors to comply with manufacturer's written instructions and with referenced quality standard, and as indicated.

3.2.3.1 Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

3.2.4 Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.2.5 Field-Finished Doors: Refer to the following for finishing requirements:

3.2.5.1 Division 09 Section "Staining and Transparent Finishing."

3.3 **ADJUSTING AND PROTECTING:**

3.3.1 Operation: Rehang or replace doors that do not swing or operate freely.

3.3.2 Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081433

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.2 Solid core doors with wood veneer faces.

1.2.1.3 Factory finishing of flush wood doors.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 8 Section "Steel Doors and Frames" for metal frames.

1.2.2.3 Division 8 Section "Door Hardware" for door hardware.

1.3. **SUBMITTALS:**

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.

1.3.3 Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for veneer matching and factory finishing and other pertinent data.

1.3.3.1 For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.

1.3.4 Samples for initial selection in the form of color charts consisting of actual materials in small sections for the following:

1.3.5 Samples for verification in the form and size indicated below:

1.3.5.1 Corner sections of doors approximately 12 inches square with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.4. **QUALITY ASSURANCE:**

1.4.1 Quality Standard: Comply with the following standard:

1.4.1.1 AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.

1.4.2 Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.

1.5.2 Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable, or concealed markings.

1.6. **PROJECT CONDITIONS:**

1.6.1 Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with the following requirements applicable to Project's geographical location:

1.6.1.1 AWI quality standard Section 100-S-11 "Relative Humidity and Moisture Content."

1.7. **WARRANTY:**

1.7.1 General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

1.7.2 Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in span, or do not conform to tolerance limitations of referenced quality standards.

1.7.2.1 Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.

1.7.2.2 Warranty shall be in effect during the following period of time after date of Substantial Completion.

1.7.2.1 Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1 Manufacturer: Subject to compliance with requirements, provide doors by one of the following:

2.1.1.1 Solid Core Doors: Eggers or approved equivalent.

2.2. **INTERIOR FLUSH WOOD DOORS:**

2.2.1 Solid Core Doors for Clear Finish: Comply with the following requirements:

2.2.1.1 Faces: Clear Maple.

2.2.1.2 Grade: Premium.

2.2.1.3 Construction: Veneer faces glued directly to core.

2.2.1.4 Core: Particleboard core.

2.2.1.5 Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.3. **FABRICATION**:

2.3.1 Fabricate flush wood doors to comply with following requirements:

2.3.1.1 In sizes indicated for job-site fitting.

2.3.2 Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels:

2.3.2.1 Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-resistance-rated doors.

2.3.3 Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.

2.3.3.1 Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine installed door frames prior to hanging door:

3.1.1.1 Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.

3.1.1.2 Reject doors with defects.

3.1.2 Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **INSTALLATION:**

3.2.1 Hardware: For installation see Division 8 Section "Door Hardware."

3.2.2 Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.

3.2.3 Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.

3.2.3.1 Fitting Clearances for Doors: Provide 1/8 inch at jambs and heads, 1/16 inch per leaf at meeting stiles for pairs of doors, and 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.

3.3. **ADJUSTING AND PROTECTION:**

3.3.1 Operation: Rehang or replace doors that do not swing or operate freely.

3.3.2 Finished Doors: Refinish or replace doors damaged during installation.

3.3.3 Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08211

SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY**:

1.2.1 This Section includes the following types of access doors:

1.2.1.1 Ceiling access doors.

1.2.1.2 Alternate No. Four Tower Ceiling/Soffit Access Door

1.3. **SUBMITTALS**:

1.3.1 General: Submit each item in this Article according to the Conditions of Contract and Division 1 Specification Sections.

1.3.2 Product data for each type of access door assembly specified, including details of construction relative to materials, individual components, profiles, finishes, and fire-protection ratings (if required).

1.3.2.1 Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, latching or locking provisions, and other data pertinent to installation.

1.3.3 Shop drawings showing fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage, and accessory items.

1.4. **QUALITY ASSURANCE**:

1.4.1 Single-Source Responsibility: Obtain access doors for entire Project from one source and by a single manufacturer.

1.4.3 Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

1.5. **COORDINATION**:

1.5.1 Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified under "Submittals" Article.

PART 2. PRODUCTS

2.1. **MANUFACTURERS:**

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

2.1.1.1 Ceiling Access Doors:

Acudor Products Inc.
Bar-Co, Inc. Div., Alfab, Inc.
Cesco Products.
Elmdor Manufacturing Co.
J.L. Industries.
Karp Associates, Inc.
Larsen's Manufacturing Co.
Milcor, Inc.
Nystrom, Inc.
The Williams Bros. Corporation of America.

2.2. **MATERIALS**:

2.2.1 Steel Sheet: ASTM A 366 commercial quality, cold-rolled steel sheet with baked-on, rust- inhibitive primer.

2.3. **ACCESS DOORS**:

2.3.1 Self-latching units consisting of frame, trim, door, insulation, and hardware, including automatic closer, interior latch release, and complying with the following requirements:

2.3.1.1 Frame with Exposed Trim: Perimeter frame with integral exposed trim complying with the following requirements:

2.3.1.1.1 Metal: 0.0598-inch thick steel sheet.

2.3.1.1.2 Trim: 1-inch flange overlapping surfaces surrounding door frame.

2.3.1.1.3 Frame Configuration: Zinc-coated steel sheet edge trim with both face and back flanges; face flange formed to receive joint compound, with thickness required to fit over edges of adjoining gypsum board panels.

2.3.1.2 Door: 0.0359-inch thick steel sheet, welded pan type.

2.3.1.3 Hinges: Continuous type.

2.3.1.4 Latches: Bolt type, operated by either a ring turn or flush key device (keyed alike).

2.3.1.5 Insulation: 2-inch thick mineral-fiber insulation.

2.3.2 Flush Access Doors with Exposed Trim: Units consisting of frame with exposed trim, door, hardware, and complying with the following requirements:

2.3.2.1 Frame: 0.0598-inch thick steel sheet.

2.3.2.2 Door: 0.0747-inch thick steel sheet.

2.3.2.3 Trim: Flange integral with frame, 3/4 inch wide, overlapping surrounding finished surface.

2.3.2.4 Hinge: Continuous type.

2.3.2.5 Locks: Flush, screwdriver-operated cam.

2.4 **CEILING ACCESS DOOR**:

2.4.1 Self-latching unit consisting of frame, trim, door, insulation and hardware, including automatic closer, interior latch release, with lock and complying with the following requirements:

2.4.1.1 Frame with exposed trim: Perimeter frame with integral exposed trim complying with the following requirements:

2.4.1.1.1 Metal: 1/4" thick steel sheet.

2.4.1.1.2 Trim: 1-1/2" flange overlapping surfaces surrounding door frame.

2.4.1.2 Door: 3/16" thick steel sheet, welded pan type.

2.4.1.3 Hinge: Continuous type.

2.4.1.4 Latch: Butt type, operated by flush key device.

2.5 **FABRICATION**:

2.5.1 General: Manufacture each access door assembly as an integral unit ready for installation.

2.5.2 Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

2.5.2.1 Exposed Flange: Nominal 1 to 1-1/2 inches wide around perimeter of frame.

2.5.3 Steel Ceiling Hatch Door and Frame Unit: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

2.5.4 Locking Devices: Furnish number required to hold door in flush, smooth plane when closed.

2.5.4.1 For cylinder lock, furnish 2 keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1. **PREPARATION**:

3.1.1 Advise Installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

3.2. **INSTALLATION**:

3.2.1 Comply with manufacturer's instructions for installing access doors.

3.2.2 Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.

3.3. **ADJUST AND CLEAN**:

3.3.1 Adjust hardware and panels after installation for proper operation.

3.3.2 Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08305

SECTION 08520 - METAL WINDOWS

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**:

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

1.2. **SUMMARY:**

1.2.1 This Section includes Commercial Grade steel windows of the performance class indicated. Window types required include the following:

1.2.1.1 Fixed and operable windows.

1.2.2 Hot-rolled steel triple weatherstripped impact approved windows with fixed configurations.

1.2.3 All window anchors, mullions, covers and trim.

1.2.4 Factory applied finished system.

1.3 **RELATED WORK SPECIFIED ELSEWHERE:**

1.3.1 Division 1 Section “Alternates” for impact resistant window framing as part of Alternate No. One scope.

1.3.2 Division 8 Section “Glazing” for metal window glazing.

1.3.3 Division 7 Section 07901 Joint Sealants for window adjacent surface sealing.

1.3.4 Division 5 Section 05500 Metal Fabrications for window lintels and wall framing reinforcing as part of Alternate No. One scope.

1.4 **PERFORMANCE REQUIREMENTS:**

1.4.1 Manufacturer shall have not less than 10 years experience in the fabrication of heavy custom steel windows and membership in SWI.

1.4.2 Installation of windows shall be done by experienced window installers.

1.4.3 Allowable tolerances: Size dimension + 1/16 inch.

1.4.4 Source quality control:

1.4.4.1 All windows shall comply with the International Building Code (IBC).

1.4.4.2 Air infiltration test:

1.4.4.2.1 Products must be independently lab tested and meet or exceed ASTM E283.

1.4.4.2.2 Maximum air infiltration 0.30 CFM/SQ. Ft. with differential pressure across window unit of 1.57/6.24 PSF.

1.4.4.3 Water penetration test:

1.4.4.3.1 Products must be independently lab tested and meet or exceed ASTM E331.

1.4.4.3.2 No water penetration for 15 minutes when window is subjected to a rate of flow of 5 gal./hr./sq. ft. with differential pressure across window unit of 4.50 PSF (or 15% design pressure for areas requiring HVHZ).

1.4.4.4 Field Test:

1.4.4.4.1 Field testing criteria (when applicable) shall be in accordance with AAMA 502-12.

1.4.4.5 Structural Test:

1.4.4.5.1 Meets or exceeds ASTM E330.

1.4.4.6 Forced entry test:

1.4.4.6.1 Meets or exceeds ASTM F588.

1.4.4.6.2 Grade 40 @ 300 pounds.

1.4.4.7 Impact test – Large Missile:

1.4.4.7.1 Meets or exceeds FBC ASTM E1996.

1.4.4.7.2 Withstand 2x4 missile impact at all designated contact points without penetration.

1.4.4.8 Cyclic wind loading test.

1.4.4.8.1 Meets or exceeds FBC ASTM E1886.

1.4.4.8.2 No failure or distress after subjected to the cyclic sequence to a designed load (positive and negative.)

1.4.4.9 Coastal finishing process shall meet or exceed the following designations (Coastal application – less than (5) mile from salt water and /or similar corrosive environments):

1.4.4.9.1 Acid Pickling: SSCP-SP8.

1.4.4.9.2 Hot-Dip Galvanize: ASTM A123.

1.4.4.9.3 Adhesion: ASTM D3359, no loss.

1.4.4.9.4 Hardness: ASTM D3363 (pencil), H min.

1.4.4.9.5 Salt Spray: ASTM B117, passes 3000 hrs.

1.4.4.9.6 Humidity: ASTM D2247, 3000 hours, few #8 blisters.

1.4.4.9.7 Alternate No. One: Impact Resistance, ASTM D2794, no loss.

1.4.4.9.8 Color Retention: ASTM D2244, 5 year less than or equal to 5 delta E.

1.4.4.9.9 Chalk Resistance: ASTM D4214, #8 rating.

1.4.4.9.10 Gloss Retention: ASTME D523, greater than or equal to 30 percent retention.

1.4.4.10 Upon request, the window manufacturer shall provide a test report form a qualified independent U.S. testing laboratory regularly engaged in testing windows to verify that products conform to these test requirements as outlined.

1.5 **SUBMITTALS:**

1.5.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.5.2 Product Data for each type of window required, including the following:

1.5.2.1 Construction details and fabrication methods.

1.5.2.2 Profiles and dimensions of individual components.

1.5.2.3 Data on hardware, accessories, and finishes.

1.5.2.4 Recommendations for maintaining and cleaning exterior surfaces.

1.5.3 Shop Drawings showing fabrication and installation of each type of window required including information not fully detailed in manufacturer's standard Product Data and the following:

1.5.3.1 Layout and installation details, including anchors.

1.5.3.2 Elevations at 1/4 inch = 1 foot scale and typical window unit elevations at 3/4 inch = 1 foot scale.

1.5.3.3 Full-size section details of typical composite members, including reinforcement and stiffeners.

1.5.3.4 Location of weep holes.

1.5.3.5 Panning details.

1.5.3.6 Hardware, including operators.

1.5.3.7 Color chart for finishes.

1.5.3.8 Glazing details.

1.5.3.9 Accessories.

1.6 **QUALITY ASSURANCE:**

1.6.1 Installer Qualifications: Engage an experienced Installer who has completed installation of metal windows similar in material, design, and extent to those required for this Project and with a record of successful in-service performance.

1.6.2 Single-Source Responsibility: Obtain metal windows from one source and by a single manufacturer.

1.7 **PROJECT CONDITIONS:**

1.7.1 Field Measurements: Check window openings by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7.1.1 Where field measurements cannot be made without delaying the Work, guarantee opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to guaranteed dimensions.

1.8 **PRODUCT, STORAGE AND HANDLING:**

1.8.1 The General Contractor shall be responsible for the protection and storage of the windows after delivery to the site.

1.8.2 Store in designated areas in an upright position on wood slats or on a dry floor in a manner that will prevent damage. Ventilate canvas or plastic coverings to prevent humidity buildup.

1.9 **WARRANTY:**

1.9.1 Provide manufacturers standard 10-year Limited Warranty.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1 Manufacturer: Subject to compliance with requirements, provide product equivalent to the following:

2.1.1.1 Hope's Landmark/175 Series

2.2 **MATERIALS:**

2.2.1 Heavy custom double weatherstripped windows shall be manufactured from solid hot-rolled steel shapes.

2.2.1.1 Profiles made from steel with flanges rolled integrally at the mill.

2.2.1.2 Perimeter frames and ventilator profiles shall have glazing rebates providing an unobstructed glazing surface of at least 3/4 – inch.

2.2.1.3 Glazing rebate surfaces must be perpendicular to the web or stem of the profile. Applied glazing rebate extensions and rebate surfaces that are tapered will not be acceptable.

2.2.1.4 Combined weight of frame and ventilator profiles shall be a minimum of 4.20 pounds per lineal foot. Frame profile alone shall not weigh less than 1.80 pounds per lineal foot.

2.2.1.5 All steel frame profiles must be a minimum of 1-3/4” in depth.

2.2.1.6 The frame and ventilator profiles shall have integral grooves located in the exterior and interior bedding contacts for the reception of triple weatherstripping.

2.2.2 Muntins:

2.2.2.1 All profiles must be a minimum of 2-inches.

2.2.3 Glazing beads shall be extruded aluminum Alloy 6063-T5 with a minimum thickness of .062 inches.

2.2.4 Weatherstripping shall be extruded EPDM closed cell sponge, closed cell neoprene, or flexible silicone, or polyethylene clad urethane foam.

2.2.5 Coastal Finishing shall be a five (5) part system as follows:

2.2.5.1 Cleaning.

2.2.5.2 Pretreatment

2.2.5.3 Hot-dip galvanizing

2.2.5.4 Epoxy powder primer

2.2.5.5 Ultrathane polyurethane top coat.

2.3 **FABRICATION:**

2.3.1 Fabricate steel windows in accordance with approved shop drawings.

2.3.2 Corners of frame and ventilator shall be mitered or coped then solidly welded. Exposed and contact surfaces shall be finished smooth flush with the adjacent surfaces. All interior and exterior rail bar and muntin joints shall be welded and ground smooth.

2.3.3 Muntins:

2.3.3.1 Divided Lite Grids

2.3.3.1.1 Interior/exterior applied muntins – Profiles shall be precut to meet perimeter frame. The intersections shall be milled and welded to the extrusion profile.

2.3.4 Glazing:

2.3.4.1 All Windows shall be designed for inside glazing.

2.3.4.2 Provide replaceable continuous glazing beads to suit the glass as specified.

2.3.4.3 Glazing beads shall be cut and shop fitted to each glass lite prior to shipment.

2.3.4.4 Manufacturer to provide correct glazing wedge and tape in accordance with the tested assembly.

2.4 **FINISHING (FACTORY):**

2.4.1 Finish Process (coastal):

2.4.1.1 Cleaning:

2.4.1.1.1 All hot-rolled steel profiles must be acid pickled to white metal as defined by SSPC – SP8 creating a pristine, white metal substrate which is paramount to achieving ultimate finish performance.

2.4.2 Pretreatment

2.4.2.1 Following welding and all machining operations, hot-rolled products and accessories are subjected to the following pretreatment process.

2.4.2.1.1 Hot Dip Galvanize

2.4.2.1.2 Parts are cleaned and immersed in a molten pool of pure zinc per ASTM A123 to create a dry film thickness (DFT) of 4-8 mils of cathodic protection.

2.4.2.1.3 Quality Control.

2.4.2.1.4 Mechanical Cleaning.

2.4.3 Brush-Off Blast Cleaning:

2.4.3.1. Galvanized parts shall be brush-off blast cleaned in accordance with SSPS-SP16 to profile surface prior to primer application.

2.4.3.2 All parts shall be oven heated prior to finishing to prevent outgassing through epoxy primer.

2.4.4 Epoxy Powder Primer:

2.4.4.1 Following pretreatment and brush-off blast cleaning all parts shall receive an abrasion resistant epoxy powder coat to ensure ultimate substrate protection. Epoxy powder primer is intended as an intermediate finish applied prior to the final finish top coat.

2.4.4.1.1 Within 12 hours of hot-dip galvanizing pretreatment all frames and accessories shall receive an epoxy powder primer for abrasion resistance.

2.4.4.1.2 After hot-dip galvanizing has been cleaned, brush-off blasted, and oven outgassed – epoxy powder primer is applied electrostatically to a dry film thickness (DFT) of 2.0 -4.0 mils.

2.4.4.1.3 Parts are oven baked in preparation of top coat application

2.4.5 Ultrathane Polyurethane Top Coat:

2.4.5.1 The top coat defines the final stage to the overall aesthetics and performance of the finished product.

2.4.5.1.1 Powder top coat is electrostatically applied to a dry film thickness (DFT) of 2.0 - 4.0 mils

2.4.5.1.2 Parts are oven baked to fully cure.

2.4.6 Finish Process Overview (coastal):

2.4.6.1 Combined overall dry film thickness (DFT) of hot-dip galvanizing, epoxy primer, and polyester powder top coat or Ultrathane Polyurethane Top Coat shall be between 8.0 – 16.0 mils.

2.4.6.2 Overall process shall provide full documented compliance with the following criteria (as applicable):

2.4.6.2.1 Acid Pickling: SSCP-SP8.

2.4.6.2.2 Hot-dip Galvanize: ASTM A123.

2.4.6.2.3 Adhesion: ASTM D3359, no loss.

2.4.6.2.4 Hardness: ASTM D3363 (pencil), H min.

2.4.6.2.5 Salt Spray: ASTMB 117, passes 3000 hrs.

2.4.6.2.6 Humidity: ASTM D2247, 3000 hours, few #8 blisters.

2.4.6.2.7 Alternate No. One: Impact Resistance, ASTM D2794, no loss.

2.4.6.2.8 Color Retention: ASTM D2244, 5 year less than or equal to 5 delta E.

2.4.6.2.9 Chalk Resistance: ASTM D4214, #8 rating.

2.4.6.2.10 Gloss Retention: ASTM D 523, greater than or equal to 30 percent retention.

PART 3 - EXECUTION

3.1 **INSPECTION:**

3.1.1 Window openings shall confirm to details, dimensions and tolerances shown on the window manufacturer's approved shop drawings.

3.1.2 Conditions which may adversely affect the window installation must be corrected before installation commences.

3.1.3 The wash down of the adjacent masonry must be completed before erection commences to prevent damage to the finish by the cleaning materials.

3.2 **INSTALLATION:**

3.2.1 Windows specified under this section shall be installed by experienced personnel.

3.2.2 Install windows in openings in strict accordance with approved shop drawings.

3.2.2.1 Set units plumb, level and true to line, without warp or rack of frames.

3.2.2.2 Anchor units securely to surrounding construction with approved fasteners.

3.2.2.3 The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and neatly pointed.

3.2.3 Repair any abraded areas of the factory finish.

3.3 **CLEANING:**

3.3.1 Window installer shall leave window surfaces clean after installation and ready to receive glass and glazing. The window installer will not be responsible for final cleaning.

END OF SECTION 08520

SECTION 08620 - UNIT SKYLIGHTS (ALTERNATE NO. FIVE)

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.1 Canopy skylight

1.2.1.2 Alternate No. Five Building Skylight

1.3 **SECTION REQUIREMENTS:**

1.3.1 Submittals: Product Data, Shop Drawings, and finish Samples.

1.3.2 Provide AAMA-certified skylights with an attached label.

PART 2 - PRODUCTS

2.1 **SKYLIGHTS:**

2.1.1 Basis-of-Design Product: Product indicated on Drawings.

2.1.1.1 CPI Daylighting Inc.

2.1.2 Type: Self-flashing with integral curb as indicated on the Drawings.

2.1.2.1 Base Flashing: Aluminum.

2.1.3 Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440.

2.1.3.1 Type, Performance Class, and Grade: SKP-CW30.

2.2 **MATERIALS:**

2.2.1 Aluminum: ASTM B 209 sheet; ASTM B 221 extrusions.

2.2.2 Aluminum Finish for Exterior Surfaces: Class II, clear anodic finish; complying with AAMA 611.

2.2.2.1 Color: Black.

2.2.3 Surface-Burning Characteristics of Plastic Glazing: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing indicated below:

2.2.3.1 Self-Ignition Temperature: 650 degree F or more when tested per ASTM D 1929.

2.2.3.2 Smoke-Developed Index or Smoke Density: 450 or less when tested per ASTM E 84 or 75 or less when tested per ASTM D 2843.

2.2.3.3 Relative-Burning Characteristics: Class CC1 according to the IBC.

2.2.4 Acrylic Glazing: ASTM D 4802, Finish 1 (smooth or polished), Type UVF (UV absorbing).

2.2.4.1 Single Glazing:

2.2.4.2 Outer Glazing Color: Colorless, transparent.

2.2.5 Glazing Profile: Double Slopes per Drawings.

2.3 **FABRICATION:**

2.3.1 Factory assembled units with extruded-aluminum glazing retainers, gasketing, self-contained flashing, and integral gutters with weeps for condensation control.

2.3.2 Integral Curb: Extruded-aluminum, self-flashing type.

2.3.2.1 Height: Per manufacturer standard.

2.3.2.2 Construction: Single wall.

PART 3 - EXECUTION

3.1 **INSTALLATION:**

3.1.1 Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for installing skylights.

3.1.2 Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, with bituminous coating on concealed metal surfaces.

3.1.3 Set skylight flanges in thick bed of roofing cement to form a seal unless otherwise indicated.

3.1.4 Where cap flashing is indicated, install to produce waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant except where overlap is indicated to be left open for ventilation.

END OF SECTION 086200

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **REFERENCES:**

1.2.1 NCBC – North Carolina Building Code (Section 1008.1.2)

1.2.2 NC Accessibility Code

1.3. **SUMMARY:**

1.3.1 This Section includes the following:

1.3.1.1 Hinges.

1.3.1.2 Key control system.

1.3.1.3 Lock cylinders and keys.

1.3.1.4 Lock and latch sets.

1.3.1.5 Electric Strikes.

1.3.1.6 Closers.

1.3.1.7 Miscellaneous door control devices.

1.3.1.8 Kick plates.

1.3.1.9 Weatherstripping for exterior doors.

1.3.1.10 Thresholds.

1.3.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.3.2.1 Division 8 Section "Steel Doors and Frames" for general door hardware and silencers integral with hollow metal frames.

1.3.2.2 Division 8 Section "Stile and Rail Wood Doors" for general door hardware.

13.2.3 Division 8 Section “Flush Wood Doors” for general door hardware.

1.4. **SUBMITTALS:**

1.4.1 General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

1.4.2 Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

1.4.3 Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1.4.3.1 Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

1.4.3.1.1 Type, style, function, size, and finish of each hardware item.

1.4.3.1.2 Name and manufacturer of each item.

1.4.3.1.3 Fastenings and other pertinent information.

1.4.3.1.4 Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.

1.4.3.1.5 Explanation of all abbreviations, symbols, and codes contained in schedule.

1.4.3.1.6 Mounting locations for hardware.

1.4.3.1.7 Door and frame sizes and materials.

1.4.3.1.8 Keying information.

1.4.3.2 Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.

1.4.3.3 Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

1.4.3.4 Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.5. **QUALITY ASSURANCE:**

1.5.1 Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

1.5.2 Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in- service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1.5.2.1 Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

1.6. **PRODUCT HANDLING:**

1.6.1 Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

1.6.2 Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

1.6.3 Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

1.6.4 Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

1.7. **MAINTENANCE:**

1.7.1 Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1 Manufacturers: Manufacturers products used in hardware set numbers are as follows:

Sargent
Corbin Russwin
Best Lock Corporation
Yale
National Guard
Stanley
Norton
Ives
Rixson-Firemark
Adams Rite
EPCO

2.1.2 Manufacturers: Subject to compliance with requirements, provide products equivalent to the following:

2.1.2.1 Butts and Hinges: Stanley

2.1.2.2 Key Control System: Sargent

2.1.2.3 MortiseLock/Latch and Cylinders: Sargent

2.1.2.4 Deadbolts: Best

2.1.2.5 Exit Devices: Yale

2.1.2.6 Electric Strikes : Adam Rite

2.1.2.7 Closers: Norton

2.1.2.8 Kick Plates: Ives

2.1.2.9 Stops: Ives

2.1.2.10 Weatherstrip and Thresholds: National Guard

2.2. SCHEDULED HARDWARE:

2.2.1 Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:

2.2.1.1 Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product.

2.3. MATERIALS AND FABRICATION:

2.3.1 Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire- rated labels and as otherwise acceptable to Architect.

2.3.1.1 Manufacturer's identification will be permitted on rim of lock cylinders only.

2.3.2 Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.

2.3.3 Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

2.3.4 Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

2.3.5 Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.4. **HINGES, BUTTS, AND PIVOTS**:

2.4.1 Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

2.4.2 Screws: Provide Phillips flat-head screws complying with the following requirements:

2.4.2.1 For metal doors and frames install machine screws into drilled and tapped holes.

2.4.2.3 Finish screw heads to match surface of hinges or pivots.

2.4.3 Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

2.4.3.1 Out-Swing Exterior Doors: Nonremovable pins.

2.4.3.2 Interior Doors: Nonrising pins.

2.4.3.3 Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.

2.4.4 Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches or less in height and one additional hinge for each 30 inches of additional height.

2.5. **LOCK CYLINDERS AND KEYING:**

2.5.1 Key System: Provide new masterkey that matches current City building. Contractor to coordinate with Owner.

2.5.2 Review the keying system with the Owner and provide the type required (master and grandmaster) integrated with Owner's Sargent Access Systems.

2.5.3 Equip locks with brass temporary interchangeable-cores for use only during construction period. Remove these when directed by the Owner.

2.5.3.1 Furnish final cores for installation by Owner. Final 6-pin cores and keys will be shipped directly to the Owner by the manufacturer. All permanent cores will be by Best.

2.5.4 Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.

2.5.5 Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

2.5.5.1 Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."

2.5.6 Key Material: Provide keys of nickel silver only.

2.5.7 Key Quantity: Furnish 3 change keys for each lock, 6 master keys for each master system, 6 grandmaster keys for each grandmaster system and 6 construction keys.

2.5.7.1 Furnish one extra blank for each lock.

2.5.7.2 Deliver keys to Owner.

2.6. **KEY CONTROL SYSTEM**:

2.6.1 Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer.

2.6.1.1 Provide complete cross index system set up by key control manufacturer, and place keys on markers and hooks in the cabinet as determined by the final key schedule.

2.6.1.2 Provide two (2) hinged-panel type wall mounted cabinets. One to be mounted in Transportation/Administration Wing Room #118. Location to be coordinated with Owner. The other cabinet will be given to Owner.

2.7. **LOCKS, LATCHES, AND BOLTS:**

2.7.1 Trim to be selected from manufacturer’s standard levers and escutcheons.

2.7.2 Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.

2.7.2.1 Provide flat lip strikes for locks with 3-piece, antifriction latchbolts as recommended by manufacturer.

2.7.2.2 Provide extra long strike lips for locks used on frames with applied wood casing trim.

2.7.2.3 Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.

2.7.2.4 Provide dust-proof strikes for foot bolts, except where special threshold construction provides nonrecessed strike for bolt.

2.7.2.5 Provide roller type strikes where recommended by manufacturer of the latch and lock units.

2.7.3 Lock Throw: Provide 5/8-inch minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

2.7.3.1 Provide 1/2-inch minimum throw of latch for other bored and preassembled types of locks and 3/4-inch minimum throw of latch for mortise locks. Provide 1-inch minimum throw for all dead bolts.

2.7.3.2 Rabbeted Doors: Where rabbeted door stiles are indicated, provide special rabbeted front on lock and latch units and bolts.

2.8 **ELECTRIC STRIKES:**

2.8.1 Provide Adam Rite 7160/7170, 24 VDC, USD Finish.

2.8.2 Coordinate electric strike with door lockset/latch.

2.9. **CLOSERS AND DOOR CONTROL DEVICES:**

2.9.1 Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.

2.9.1.1 Provide parallel arms for all overhead closers, except as otherwise indicated.

2.9.2 Access-Free Manual Closers: Closers are to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.

2.9.3 Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and close door automatically under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

2.9.4 Provide brown resilient parts for exposed bumpers.

2.10. **DOOR TRIM UNITS:**

2.10.1 Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.

2.10.2 Fabricate edge trim of bronze to fit door thickness in standard lengths or to match height of kick plates.

2.10.3 Fabricate kick plates not more than 1-1/2 inches less than door width on hinge side and not more than 1/2 inch less than door width on pull side by height indicated.

2.10.3.1 Sizes: Provide protection plates 2 inches less than door width and 8 inches in height unless otherwise noted.

2.11 **WEATHERSTRIPPING AND SEALS:**

2.11.1 General: Provide continuous weatherstripping on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.11.2 Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

2.11.3 Weatherstripping at Jambs and Heads: Provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortised or semimortised, and of following metal, finish, and resilient bumper material:

2.11.3.1 Extruded bronze (brass), finish to match frame, 0.050- inch minimum thickness of main walls and flanges.

2.11.3.2 Expanded neoprene: Cellular rubber conforming to ASTM D 1056 Type 2 (closed-cell); Class B (low-swell, oil-resistant); Grade 2 (compression-deflection of 5 - 9 psi; and self-extinguishing in following size:

2.11.4 Extruded aluminum with color anodized finish as selected from manufacturer's standard color range.

2.12 **THRESHOLDS:**

2.12.1 General: Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile as shown or scheduled.

2.12.2 Exterior Hinged: Provide units not less than 4 inches wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames, and as follows:

2.12.2.1 For out-swinging doors provide rabbeted type units with replaceable weatherstrip insert in stop.

2.13 **HARDWARE FINISHES:**

2.13.1 Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).

2.13.2 Provide finishes that match those established by BHMA or, if none established, match the Architect's sample.

2.13.3 Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

2.13.4 Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."

2.13.5 The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.

PART 3 - EXECUTION

3.1. **INSTALLATION:**

3.1.1 Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

3.1.1.1 "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

3.1.1.2 NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

3.1.2 Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

3.1.3 Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

3.1.4 Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.1.5 Set thresholds for exterior doors in full bed of butyl- rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."

3.1.6 Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2. **ADJUSTING, CLEANING, AND DEMONSTRATING:**

3.2.1 Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

3.2.1.1 Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.2.2 Clean adjacent surfaces soiled by hardware installation.

3.2.3 Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

3.2.4 Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the Installer, accompanied by representatives of the manufacturers of latchsets and locksets and of door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:

3.2.4.1 Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.

3.2.4.2 Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.

3.2.4.3 Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

3.2.4.4 Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.3. **HARDWARE SCHEDULE:**

3.3.1 General: Provide hardware for each door to comply with requirements of Section "Door Hardware," hardware set numbers indicated on Drawing A9.1.

END OF SECTION 08710

SECTION 08716 - AUTOMATIC DOOR OPERATORS

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1 Power door operators shall be in compliance with overall project, Buy America Requirements.

1.2.2. This Section includes the following:

1.2.2.1. Power door operators at all exterior/interior as indicated on Drawings.

1.2.3. Related Sections include the following:

1.2.3.1 Division 8 Section "Steel Doors" for doors.

1.2.3.2 Division 8 section "Stile and Rail Wood Doors" for doors.

1.2.3.3 Division 16 Sections for electrical connections including conduit and wiring for automatic door operators.

1.3 **DEFINITIONS:**

1.3.1. Activation Device: Device that, when actuated, sends electrical signal to automatic door operator to open door.

1.3.2. Safety Device: Device that prevents door from opening or closing.

1.4 **PERFORMANCE REQUIREMENTS:**

1.4.1. Opening and Closing Forces: Not more than 15 lbf 1 inch from the latch edge of the door.

1.5 **SUBMITTALS:**

1.5.1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators and activation and safety devices.

1.5.2. Shop Drawings: Show fabrication and installation details for automatic door operators. Include locations and elevations of entrances showing activation and safety devices.

1.5.2.1. Include plans, elevations, sections, details, and attachments to other work for guide rails.

1.5.3. Samples for Verification: For exposed components and activation and safety devices with factory-applied color finishes.

1.5.4. Qualification Data: For manufacturer.

1.5.5. Operation and Maintenance Data: For automatic door operators to include in emergency, operation, and maintenance manuals.

1.5.6. Warranties: Special warranties specified in this Section.

1.6 **QUALITY ASSURANCE:**

1.6.1. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1.6.1.1. Maintenance Proximity: Not more than two (2) hours' normal travel time from Installer's place of business to Project site.

1.6.2. Manufacturer Qualifications: Company certificate issued by AAADM.

1.6.3. Source Limitations: Obtain automatic door operators through one source from a single manufacturer.

1.6.4. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6.5. UL Standard: Comply with UL 325.

1.7 **PROJECT CONDITIONS:**

1.7.1. Field Measurements: Verify door openings by field measurements before fabrication of exposed covers for automatic door operators and indicate measurements on Shop Drawings.

1.8 **COORDINATION:**

1.8.1. Coordinate size and locations of recesses in concrete floors for recessed control mats that control automatic door operators. Concrete, reinforcement, and formwork requirements are specified in Division 3.

1.8.2. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing automatic door operators. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.

1.8.3. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies.

1.9 **WARRANTY:**

1.9.1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.

1.9.1.1. Failures include, but are not limited to, the following:

1.9.1.1.1. Faulty or sporadic operation of automatic door operator or activation and safety devices.

1.9.1.1.2. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.

1.9.1.2. Warranty Period: Two (2) years from date of Substantial Completion.

1.10 **MAINTENANCE SERVICE:**

1.10.1. Maintenance: Beginning at Substantial Completion, provide six (6) months' full maintenance by skilled employees of automatic door operator Installer. Include quarterly planned and preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10.1.1. Engage inspector certified by AAADM to perform safety inspection after each adjustment or repair and at end of maintenance period. Submit completed inspection form to Owner.

1.10.1.2. Perform maintenance, including emergency callback service, during normal working hours.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1. 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:

2.1.1.1. Besam Automated Entrance Systems, Inc.

2.1.1.2. Dor-O-Matic, Inc.; an Ingersoll-Rand Company.

2.1.1.3. Stanley Access Technologies; Div. of The Stanley Works.

2.2 **MATERIALS:**

2.2.1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with standards indicated below:

2.2.1.1. Sheet: ASTM B 209.

2.2.1.2. Extrusions: ASTM B 221.

2.2.2. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

2.3 **AUTOMATIC DOOR OPERATORS, GENERAL:**

2.3.1. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

2.3.1.1. Provide door operators that comply with NFPA 80 requirements for doors as emergency exits and that do not interfere with fire ratings.

2.4 **POWER DOOR OPERATORS:**

2.4.1. Standard: Comply with BHMA A156.10.

2.4.2. Performance Requirements:

2.4.2.1. Not more than 40 lbf 1 inch from latch edge of door to prevent stopped door from opening or closing.

2.4.2.2. If power fails, not more than 30 lbf 1 inch from latch edge of door to manually open door.

2.4.3. Operation: Power opening and spring closing.

2.4.3.1. Power-Assisted Opening: Power-assisted opening that reduces force to open self-closing door. Pushing or pulling on door activates automatic door operator.

2.4.4. Operating System: Electromechanical.

2.4.5. Microprocessor Control Unit: Solid-state controls.

2.4.6. Features:

1. Adjustable opening speed.
2. Adjustable opening force.
3. Adjustable backcheck.
4. Adjustable hold-open time of not less than 0 to 30 seconds.
5. Adjustable time delay.
6. Adjustable acceleration.
7. Adjustable limit switch.
8. Obstruction recycle.

2.4.7. Mounting: Surface.

2.5 **ACTIVATION AND SAFETY DEVICES:**

2.5.1. Wall Push-Plate Switch: Manufacturer's standard semiflush, wall-mounted, door control switch; consisting of round or square, flat push plate; of material indicated; and actuator mounted in recessed junction box. Provide engraved message as indicated.

2.5.1.1. Material: Stainless steel.

2.5.1.2. Message: International symbol of accessibility.

2.5.1.3. Mounting: As indicated on Drawings.

2.5.2. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.6 **ACCESSORIES:**

2.6.1. Automatic Door Operator Signage: Comply with BHMA A156.10.

2.7 **FINISHES, GENERAL:**

2.7.1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.7.2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.7.3. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 **ALUMINUM FINISHES:**

2.8.1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

2.8.2. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

2.8.2.1. Color: Match framing/door.

PART 3 – EXECUTION

3.1 **EXAMINATION:**

3.1.1. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame supports, and other conditions affecting performance of automatic door operators.

3.1.1.1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.

3.1.2. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.

3.1.3. Examine roughing-in for compressed-air piping systems to verify actual locations of piping connections before automatic door operator installation.

3.1.4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

3.2.1. General: Install complete automatic door operator system, including activation and safety devices, control wiring, and remote power units.

3.2.2. Power Door Operator Installation Standard: Comply with BHMA A156.10 for installation.

3.2.2.1. Refer to Division 16 Sections for connection to electrical power distribution system.

3.2.3. Activation and Safety Devices: Install devices and wiring, including connections to automatic door operators, according to BHMA A156.10 and as follows:

3.2.3.1. Photoelectric Beams: Install beams on each door jamb indicated to receive automatic door operators.

3.2.3.2. Wall Switches: Provide push plates on both sides of each opening indicated to receive automatic door operators.

3.2.4. Connect wiring according to Division 16 Section "Conductors and Cables."

3.3 **FIELD QUALITY CONTROL:**

3.3.1. Testing and Inspecting: After installation has been completed, testing and inspecting of each automatic door operator shall be performed to verify compliance with applicable BHMA standards.

3.3.1.1. Inspection Report: Submit report in writing to Architect and Contractor within 24 hours after inspection.

3.3.2. Remove and replace automatic door operators where test results indicate they do not comply with specified requirements.

3.3.3. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.4 **ADJUSTING:**

3.4.1. Adjust automatic door operators and activation and safety devices to operate smoothly, easily, and properly, and for safe operation and weathertight closure.

3.4.1.1. Adjust doors with low-energy door operators to close according to BHMA A156.19.

3.4.2. Lubricate operators, hardware, and other moving parts.

3.4.3. After completing installation of exposed, factory-finished automatic door operators, inspect exposed finishes and repair damaged finishes.

3.4.4. Readjust automatic door operators and activation and safety devices after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.

3.4.5. Occupancy Adjustment: When requested within six (6) months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

3.5 **DEMONSTRATION:**

3.5.1. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 08716

SECTION 08800 - GLAZING

PART 1. - GENERAL

1.1. **RELATED DOCUMENTS**:

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

1.2. **SUMMARY**:

1.2.1 This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1.2.1.1 Metal Window framing insulated glass units.

1.2.1.2 Entry framing insulated glass units.

1.2.1.3 Interior door vision lites.

1.2.2 Related Sections: The following sections contain requirements that relate to this Section.

1.2.2.1 Division 1 Section “Alternates” for impact resistant glazing as part of Alternate No. One scope.

1.2.2.2 Division 8 Section “Metal Windows” for window glazing.

1.2.2.3 Division 8 Section “Steel Doors and Frames” for doors and sidelight glazing.

1.2.2.4 Division 8 Section “Flush Wood Doors” for doors.

1.3. **DEFINITIONS**:

1.3.1 Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.

1.3.2 Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's directions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated glass standard.

1.3.3 Deterioration of Insulating Glass: Failure of the hermetic seal under normal use due to causes other than glass breakage and improper practices for maintaining, and cleaning insulating glass. Evidence of failure is the obstruction of vision by dust, moisture, or film on the interior surfaces of glass. Improper practices for maintaining and cleaning glass do not comply with the manufacturer's directions.

1.4. **SYSTEM PERFORMANCE REQUIREMENTS**:

1.4.1 General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

1.4.2 Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:

1.4.3 Normal thermal movement results from the following maximum change in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.

1.4.3.1 Temperature Change: 120 F deg ambient; 180 F deg material surfaces.

1.5. **SUBMITTALS**:

1.5.1 General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

1.5.2 Product data for each glass product and glazing unit indicated.

1.5.3 Samples for verification purposes of 12-inch square samples of each type of glass indicated except for clear monolithic glass products, and 12-inch long samples of each color required for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.

1.5.4 Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.

1.5.5 Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.

1.5.6 Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.

1.5.7 Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.

1.5.8 Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 1.

1.6. **QUALITY ASSURANCE**:

1.6.1 Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1.6.1.1 FGMA Publications: "FGMA Glazing Manual."

1.6.1.2 SIGMA Publications: TM-3000 "Vertical Glazing Guidelines".

1.6.2 Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

1.6.2.1 Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

1.6.3 Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:

1.6.3.1 Insulating Glass Certification Council (IGCC).

1.6.4 Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

1.6.5 Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

1.6.5.1 Primary glass of each (ASTM C 1036) type and class indicated.

1.6.5.2 Laminated glass of each (ASTM C 1172) kind indicated.

1.6.5.3 Insulating glass of each construction indicated.

1.6.6 Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.7. **DELIVERY, STORAGE, AND HANDLING**:

1.7.1 Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7.1.1 Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8. **PROJECT CONDITIONS**:

1.8.1 Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.8.1.1 Install liquid sealants at ambient and substrate temperatures above 40 deg F.

1.9. **WARRANTY**:

1.9.1 General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

1.9.2 Manufacturer's Warranty on Insulating Glass: Submit written warranty signed by manufacturer of insulating glass agreeing to furnish replacements for insulating glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.

1.9.2.1 Warranty Period: Manufacturer's standard but not less than 2 years after date of Substantial Completion.

PART 2. - PRODUCTS

2.1. **MANUFACTURERS**:

2.1.1 Products: Subject to compliance with requirements, provide one of the products specified in Product Data Sheets at end of this Section.

2.2. **PRIMARY FLOAT GLASS PRODUCTS**:

2.2.1 Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class as indicated below, and Quality q3 (glazing select).

2.2.1.1 Class 1 (clear) unless otherwise indicated.

2.2.2 Refer to Primary Clear Float Glass Product Data Sheet for Class 1 uncoated tinted glass for monolithic glazing.

2.3. **LAMINATED GLASS PRODUCTS**:

2.3.1 Laminated Glass Products: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified, including those in Laminated Glass Product Data Sheet at the end of this Section. Refer to primary and heat-treated glass requirements relating to properties of glass products comprising laminated glass products.

2.3.2 Interlayer: Interlayer material as indicated below, in clear or colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.

2.3.2.1 Interlayer Material: Polyvinyl butyral sheets.

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

2.3.3.1 Polyvinyl Butyral Interlayer:

Saflex, Monsanto Co.
Butacite, E. I. du Pont de Nemours & Co., Inc.

2.3.4 Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:

2.3.4.1 Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.

2.4. **INSULATING GLASS PRODUCTS:**

2.4.1 Sealed Insulating Glass Units: Preassembled units consisting of two (2) pieces of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated.

2.4.2 Alternate No. One: Sealed impact resistant insulated glass units: Preassembled units consisting of multiple pieces of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated.

2.4.3 For properties of individual glass lites making up units, refer to requirements indicated on the Drawings applicable to types, classes, kinds, and conditions of glass products comprising lites of insulating glass units or

2.4.3.1. U-Value = 0.45 or less; with Doors 0.77 or less
Solar Heat Gain Coefficient = 0.25 or less
Visible Light Transmission = 0.60 or greater

2.4.3.2 U-values are expressed as Btu/hr x sq. ft. x deg F.

2.4.4 Sealed Insulating Units: 1-inch (overall) thickness.

2.4.4.1. Inner lites ASTM C 1036 Type I, Class 1 (clear), quality q4, 1/4 - inch thick.

2.4.1.2. Outer lite ASTM C 1036 Type I, Class 2 (heat absorbing), quality q4, 1/4 - inch, solar control Low-E glass.

2.4.5 Alternate No. One: Impact resistant sealed insulating glazing units: 1 1/4 - inch (overall) thickness.

2.4.5.1 Inner Lite ASTM C1036 Type 1, Class 1 (clear), quality q4, two (2), 1/4 - inch, laminated, tempered lites.

2.4.5.2 Outer Lite ASTM C 1036 Type 1 Class 2 (heat absorbing tempered) quality q4, 1/4 - inch, solar control, Low-E glass.

2.5. **GLAZING TAPES**:

2.5.1 Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with AAMA 800 for products indicated below:

2.5.1.1 AAMA 804.1.

2.5.2 Expanded Cellular Glazing Tape: Closed-cell, polyvinyl chloride foam tape, factory coated with adhesive on both surfaces, packaged on rolls with release liner protecting adhesive, and complying with AAMA 800 for product 810.5.

2.5.3 Products: Subject to manufacturer compliance with requirements, provide one of the following:

2.5.3.1 Back-Bedding Mastic Glazing Tape Without Spacer Rod:

2.5.3.1.1 PTI 303 Glazing Tape (shimless), Protective Treatments, Inc.

2.5.3.1.2 S-M 5700 Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.

2.5.3.1.3 Tremco 440 Tape, Tremco Inc.

2.6. **MISCELLANEOUS GLAZING MATERIALS**:

2.6.1 General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

2.6.2 Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.6.3 Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.

2.6.4 Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

2.6.5 Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).

2.7. **FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS**:

2.7.1 Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3. - EXECUTION

3.1. **EXAMINATION**:

3.1.1 Examine glass framing, with glazier present, for compliance with the following:

3.1.1.1 Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.

3.1.1.2 Presence and functioning of weep system.

3.1.1.3 Minimum required face or edge clearances.

3.1.1.4 Effective sealing between joints of glass-framing members.

3.1.2 Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2. **PREPARATION**:

3.2.1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.3. **GLAZING, GENERAL**:

3.3.1 Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

3.3.2 Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

3.3.3 Protect glass from edge damage during handling and installation as follows:

3.3.3.1 Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.

3.3.3.2 Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

3.3.4 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

3.3.5 Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

3.3.6 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

3.3.7 Provide spacers for glass sizes larger than 50 united inches (length plus height) as follows:

3.3.7.1 Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.

3.3.7.2 Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

3.3.8 Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.

3.3.9 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4. **TAPE GLAZING**:

3.4.1 Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.

3.4.2 Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.

3.4.3 Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

3.4.4 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

3.4.5 Do not remove release paper from tape until just before each lite is installed.

3.4.6 Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5. **PROTECTION AND CLEANING**:

3.5.1 Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

3.5.2 Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

3.5.3 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.

3.5.4 Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

3.5.5 Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08800

SECTION 09220 – STUCCO

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1 This Section includes the following:

1.2.1.1 Exterior wall stucco finish system.

1.2.2 Related Sections include the following:

1.2.2.1 Division 5 Section “Cold-Formed Metal Framing” for metal exterior wall framing and furring.

1.2.2.2 Division 6 Section “Sheathing” for sheathing.

1.2.2.3 Division 7 Section “Joint Sealants” for sealants installed with exterior stucco wall finish.

1.3 **SUBMITTALS**

1.3.1 Product Data: For each type of product indicated.

1.3.2 Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.

1.3.3 Samples for Initial Selection: For each type of factory-prepared finish coat indicated.

1.4 **DELIVERY, STORAGE, AND HANDLING**

1.4.1 Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.5 **PROJECT CONDITIONS**

1.5.1 Comply with ASTM C 926 requirements.

1.5.2 Exterior Stucco:

1.5.2.1 Apply and cure stucco to prevent stucco drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.

1.5.2.2 Apply stucco when ambient temperature is greater than 40 deg F.

1.5.2.3 Protect stucco coats from freezing for not less than 48 hours after set of stucco coat has occurred.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

2.1.1 Stucco: Reinforced multi-coat/three (3) system.

2.1.1.1 Product: Subject to compliance with requirements, provide product specified; or approved equivalent to Sto Corp.

2.2 ACCESSORIES

2.2.1 General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

2.2.2 Zinc and Zinc-Coated (Galvanized) Accessories:

2.2.2.1 Manufacturers:

2.2.2.1.1 Dale/Incor.

2.2.2.1.2 Dietrich Industries, Inc.

2.2.2.1.3 Phillips Manufacturing Co.

2.2.2.2 Foundation Weep Screed: Fabricated from hot-dip galvanized steel sheet, ASTM A 653/A 653M, G60 zinc coating.

2.2.2.3 Cornerite: Fabricated from metal lath with ASTM A 653, G60, hot-dip galvanized zinc coating.

2.2.2.4 External-Corner Reinforcement: Fabricated from metal lath with ASTM A 653, G60, hot-dip galvanized zinc coating.

2.2.2.5 Cornerbeads: Fabricated from zinc-coated (galvanized) steel.

2.2.2.5.1 Small nose cornerbead with expanded flanges; use unless otherwise indicated.

2.2.2.5.2 Bull nose cornerbead, radius 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.

2.2.2.6 Window Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.

2.2.2.7 Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

2.3.2 Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in portland cement plaster.

2.3.3 Bonding Compound: ASTM C 932.

2.3.4 Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of not fewer than three exposed threads.

2.3.5 Isolation Strip at Exterior Walls:

2.3.5.1 Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

2.4 STUCCO MATERIALS

2.4.1 Ready-Mixed Finish-Coat Stucco: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.

2.4.1.1 Products:

2.4.1.1.1 Sto Corp.; Exterior Powerwall Stucco System/Drainscreen System.

2.4.1.2 Colors: As indicated on the drawings.

PART 3 – EXECUTION

3.1 EXAMINATION

3.1.1 Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

3.1.1.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.2.1 Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

3.2.2 Prepare solid-plaster bases that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

3.3 INSTALLING ACCESSORIES

3.3.1 Install according to ASTM C 1063 and at locations indicated on Drawings.

3.3.2 Reinforcement for External Corners:

3.3.2.1 Install lath-type external-corner reinforcement at exterior locations.

3.3.2.2 Install cornerbead at interior and exterior locations.

3.3.3 Expansion and Control Joints: Install expansion control joints at locations indicated on Drawings.

3.3.3.1 As required to delineate stuccowork into areas (panels) of the following maximum sizes:

3.3.3.1.1 Vertical Surfaces: 144 sq. ft.

3.3.3.1.2 Horizontal and other Nonvertical Surfaces: 100 sq. ft.

3.3.3.2 At distances between control joints of not greater than 18 feet o.c.

3.3.3.3 As required to delineate stuccowork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.

3.3.3.4 Where control joints occur in surface of construction directly behind stucco.

3.3.3.5 Where stuccowork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.4 STUCCO APPLICATION

3.4.1 General: Comply with ASTM C 926.

3.4.1.1 Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished stucco surfaces, as measured by a 10-foot straightedge placed on surface.

3.4.1.2 Grout hollow-metal frames, bases, and similar work occurring in stucco areas, with base-coat stucco material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches at each jamb anchor.

3.4.1.3 Finish stucco flush with metal frames and other built-in metal items or accessories that act as a stucco ground, unless otherwise indicated. Where casing bead does not terminate stucco at metal frame, cut base coat free from metal frame before stucco sets and groove finish coat at junctures with metal.

3.4.1.4 Provide stucco surfaces that are ready to receive field-applied finishes indicated.

3.4.2 Stucco Finish Coats: Apply to provide float finish to match Architect's sample.

3.5 CLEANING AND PROTECTION

3.5.1 Remove temporary protection and enclosure of other work. Promptly remove stucco from doorframes, windows, and other surfaces not indicated to receive stucco finish. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 09220

SECTION 09255 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.1 Gypsum board assemblies attached to existing steel roof framing.

1.2.1.2 Gypsum board assemblies attached to metal framing.

1.2.1.3 Gypsum board assemblies attached to metal ceiling suspension system.

1.2.1.4 Partition and ceiling acoustical insulation batts.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 5 Section "Cold-Formed Metal Framing" for metal framing and furring.

1.2.2.2 Division 7 Section "Firestopping" for firestopping systems.

1.3. **DEFINITIONS:**

1.3.1 Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4. **SUBMITTALS:**

1.4.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.4.2 Product Data for each type of product specified.

1.4.3 Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.5. **QUALITY ASSURANCE:**

1.5.1 Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

1.5.2 Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.5.3 Mockups: Prior to finishing gypsum board assemblies, construct mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects of finishes as well as qualities of materials and execution. Simulate finished lighting conditions for review of in-place unit of Work.

1.5.3.1 Construct mockups for each of the following applications:

1.5.3.1.1 Wall surfaces indicated to receive nontextured paint finishes.

1.5.3.1.2 Ceiling surfaces indicated to receive nontextured paint finishes.

1.5.3.1.3 Surfaces indicated to receive textured finishes specified in this Section.

1.5.3.2 Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1.5.3.2.1 Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.

1.5.3.2.2 Notify Architect one week in advance of the dates and times when mockups will be constructed.

1.5.3.2.3 Demonstrate the proposed range of aesthetic effects and workmanship.

1.5.3.2.4 Obtain Architect's approval of mockups before start of final unit of Work.

1.5.3.2.5 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

1.5.3.2.5.1 NOTE: Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.6. **DELIVERY, STORAGE, AND HANDLING:**

1.6.1 Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

1.6.2 Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.7. **PROJECT CONDITIONS:**

1.7.1 Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

1.7.2 Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F for 48 hours before application and continuously after until dry. Do not exceed 95 deg F when using temporary heat sources.

1.7.3 Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

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

2.1.1.2 Gypsum Board and Related Products:

Domtar Gypsum.
Georgia-Pacific Corp.
National Gypsum Co.; Gold Bond Building Products Division.
United States Gypsum Co.

2.2 **GYPSUM BOARD PRODUCTS:**

2.2.1 General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.

2.2.2 Gypsum Wallboard: ASTM C 36 and as follows:

2.2.2.1 Type: Sag-resistant type for ceiling surfaces.

2.2.2.2 Edges: Tapered.

2.2.2.3 Thickness: 5/8 inch.

2.2.3 Water-Resistant Gypsum Backing Board: ASTM C 630 and as follows:

2.2.3.1 Type: Regular, unless otherwise indicated.

2.2.3.2 Thickness: 5/8 inch, unless otherwise indicated.

2.2.4 Cement Backing Board: ASTM 1325 and as follows

2.2.4.1 Type: Regular.

2.2.4.2 Thickness: 5/8 inch.

2.3 **TRIM ACCESSORIES:**

2.3.1 Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:

2.3.1.1 Material: Formed metal or plastic, with metal complying with the following requirement:

2.3.1.2 Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:

2.3.1.2.1 Cornerbead on outside corners, unless otherwise indicated.

2.3.1.2.2 LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.

2.3.1.2.3 L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.

2.3.2 Accessories for Exterior Installations: Cornerbead, edge trim, and control joints formed from steel sheet zinc coated by hot-dip process or rolled zinc complying with ASTM C 1047, in shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.

2.3.2.1 Edge trim complying with shape LC-bead per Fig. 1, unless otherwise indicated.

2.3.2.2 One-piece control joint formed from rolled zinc with V- shaped slot and removable strip covering slot opening.

2.4 **JOINT TREATMENT MATERIALS:**

2.4.1 General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

2.4.2 Joint Tape for Gypsum Board:

2.4.2.1 Use pressure-sensitive or staple-attached, paper reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.

2.4.3 Drying-Type Joint Compounds for Gypsum Board: Factory- packaged vinyl-based products complying with the following requirements for formulation and intended use.

2.4.3.1 Ready-Mixed Formulation: Factory-mixed product.

2.4.3.1.1 Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.

2.4.3.1.2 Topping compound formulated for fill (second) and finish (third) coats.

2.4.3.1.3 All-purpose compound formulated for both taping and topping compounds.

2.5 **MISCELLANEOUS MATERIALS:**

2.5.1 General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

2.5.2 Steel drill screws complying with ASTM C 1002 for the following applications:

2.5.2.1 Fastening gypsum board to steel members less than 0.033 inch thick.

2.5.2.2 Fastening gypsum board to wood members.

2.5.3 Sound-Attenuation Blankets: Unfaced fiberglass sound control batts in thickness noted on Drawings.

2.6 **METAL SUPPORTS FOR SUSPENDED AND FURRED CEILINGS:**

2.6.1 General: Provide components complying with ASTM C 841 for sizes and conditions indicated.

2.6.2 Wire for Handers and Ties: ASMT A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.

2.6.3 Suspension System: 1-3/8 inch deep furring runners and tees with 15/16 inch face.

PART 3. EXECUTION

3.1 **EXAMINATION:**

3.1.1 Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in- anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 **PREPARATION:**

3.2.1 Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

3.3 **APPLYING AND FINISHING GYPSUM BOARD, GENERAL:**

3.3.1 Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

3.3.2 Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3.3 Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

3.3.4 Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

3.3.5 Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.

3.3.6 Attach gypsum panels to framing provided at openings and cutouts.

3.3.7 Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Instead, float gypsum panels over these members using resilient channels or provide control joints to counteract wood shrinkage.

3.3.8 Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.

3.3.9 Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.3.9.1 Space screws a maximum of 12 inches o.c. for vertical applications.

3.4 **GYPSUM BOARD APPLICATION METHODS:**

3.4.1 Single-Layer Application: Install gypsum wallboard panels as follows:

3.4.1.1 On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.

3.4.1.2 Stagger abutting end joints not less than one framing member in alternate courses of board.

3.4.1.3 Install water-resistant gypsum backing board panels at exposed toilet walls where indicated. Install with 1/4- inch open space where panels abut other construction or penetrations.

3.4.1.4 Install cement backing board at all concrete masonry wainscot and full-height furred walls as indicated in the Drawings.

3.4.2 Fastening Methods: Apply gypsum panels to supports as follows:

3.4.2.1 Fasten with screws.

3.4.3 Multilayer Fastening Methods: Apply base layers of gypsum panels and face layers of base layer as follows:

3.4.3.1 Fasten both base layer and face layer separately to support with screws.

3.5 **INSTALLING TRIM ACCESSORIES:**

3.5.1 General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.

3.5.2 Install cornerbead at external corners.

3.5.3 Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

3.5.3.1 Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.

3.5.3.2 Install L-bead where edge trim can only be installed after gypsum panels are installed.

3.5.3 Install exterior control joints at locations indicated.

3.6 **FINISHING GYPSUM BOARD ASSEMBLIES:**

3.6.1 General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

3.6.2 Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

3.6.3 Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.

3.6.4 Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.

3.6.4.1 Level 1 for ceiling plenum areas, concealed areas, unless a higher level of finish is required for fire-resistance- rated assemblies.

3.6.4.2 Level 3 for gypsum board finish wall surfaces including moisture resistant, unless otherwise indicated.

3.6.5.1 Embedding and First Coat: Ready-mixed, drying-type, all- purpose or taping compound. Fill (Second) Coat: Ready- mixed, drying-type, all-purpose or topping compound. Finish (Third) Coat: Ready-mixed, drying-type, all- purpose or topping compound.

3.6.6 For Level 3 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.

3.6.7 Where Level 1 gypsum board finish is indicated, embed tape in joint compound.

3.6.9 Finish cement board behind the concrete masonry to comply with ASTM C 840 and board manufacturer's directions for treatment of joints.

3.7 **FIELD QUALITY CONTROL:**

3.7.1 Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

3.7.1.1 Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.

3.7.1.2 Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:

3.7.1.2.1 Installation, insulation, and leak and pressure testing of water piping systems.

3.7.1.2.2 Installation of air duct systems.

3.7.1.2.3 Installation of air devices.

3.7.1.2.4 Installation of mechanical system control wiring.

3.7.1.2.5 Installation of ceiling support framing.

3.8 **CLEANING AND PROTECTION:**

3.8.1 Promptly remove any residual joint compound from adjacent surfaces.

3.8.2 Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 09255

SECTION 09310 - CERAMIC TILE

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1. This Section includes the following:

1.2.1.1. Shower tile walls and floor.

1.2.1.2. Crack-suppression membrane for thin-set tile installations.

1.2.1.3. Metal edge strips installed as part of tile installations.

1.2.2. Related Sections include the following:

1.2.2.1. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 **DEFINITIONS**

1.3.1. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

1.3.2. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).

1.4 **PERFORMANCE REQUIREMENTS**

1.4.1. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1.4.1.1. Level Surfaces: Minimum 0.6.

1.5 **SUBMITTALS**

1.5.1. Product Data: For each type of product indicated.

1.5.2. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

1.5.3. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

1.5.4. Samples for Verification:

1.5.4.1. Full-size units of each type and composition of tile and for each color and finish required.

1.5.4.2. Full-size units of each type of trim and accessory for each color and finish required.

1.5.4.3. Metal edge strips in 6-inch lengths.

1.5.5. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

1.5.6. Product Certificates: For each type of product, signed by product manufacturer.

1.5.7. Qualification Data: For Installer.

1.5.8. Material Test Reports: For each tile-setting and -grouting product.

1.6 **QUALITY ASSURANCE**

1.6.1. Source Limitations for Tile: Obtain all tile from one source or producer.

1.6.1.1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

1.6.2. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.6.3. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:

1.6.3.1. Joint sealants.

1.6.3.2. Metal edge strips.

1.6.4. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.

1.6.4.1. Build mockup of each type of floor tile installation.

1.6.4.2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

1.7.2. Store tile materials on elevated platforms, under cover, and in a dry location.

1.7.3. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

1.7.4. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

1.8.1. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.1.1. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

2.1.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.1.1.2. Basis-of-Design Product: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 **PRODUCTS, GENERAL**

2.2.1. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

2.2.1.1. Provide tile complying with Standard grade requirements, unless otherwise indicated.

2.2.1.2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

2.2.2. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.

2.2.3. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

2.2.4. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.2.5. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 **TILE PRODUCTS**

2.3.1. Manufacturers:

1. American Olean
2. Crossville Ceramics Company, L.P.
3. Daltile: Div. of Dal-Tile International Inc.
4. Florida Tile

2.4 **CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS**

2.4.1. General: Manufacturer's standard product that complies with ANSI A118.10, selected from the following.

2.4.2. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-portland cement mortar; 60 inches wide by 0.030-inch nominal thickness.

2.4.2.1. Product: Noble Company (The); Nobleseal TS.

2.4.3. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement.

2.4.3.1. Products:

a. Custom Building Products; Trowel & Seal Waterproofing and Anti-Fracture Membrane.
b. MAPEI Corporation; PRP M19.
c. Summitville Tiles, Inc.; S-9000.

2.5 SETTING AND GROUTING MATERIALS

2.5.1. Manufacturers:

1. Atlas Minerals & Chemicals, Inc.
2. Custom Building Products.
3. Laticrete
4. MAPEI Corporation.
5. Tec Specialties

2.5.2. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5.3. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.

2.5.3.1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

2.6 ELASTOMERIC SEALANTS

2.6.1. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."

2.6.1.1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6.2. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

2.6.3. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.6.3.1. Products:

a. Dow Corning Corporation; Dow Corning 786.
b. GE Silicones; Sanitary 1700.
c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
d. Tremco, Inc.; Tremsil 600 White.

2.7 MISCELLANEOUS MATERIALS

2.7.1. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

2.7.2. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.

2.7.3. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

2.7.3.1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.

2.7.4. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.7.5. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

2.7.5.1. Products:

a. Bonsal, W. R., Company; Grout Sealer.
b. Jamo Inc.; Matte Finish Sealer.
c. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
d. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
e. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

2.8 MIXING GROUT

2.8.1. Mix grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

2.8.2. Add materials, water, and additives in accurate proportions.

2.8.3. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

3.1.1.1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

3.1.1.2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

3.1.1.3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

3.1.2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **PREPARATION**

3.2.1. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

3.2.2. Provide concrete substrates for tile floors installed with adhesives that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

3.2.2.1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.

3.2.2.2. Remove protrusions, bumps, and ridges by sanding or grinding.

3.2.3. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.2.4. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 **INSTALLATION, GENERAL**

3.3.1. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

3.3.2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

3.3.3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

3.3.4. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

3.3.5. Grout tile to comply with requirements of the following tile installation standards:

3.3.5.1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

3.4 CRACK-SUPPRESSION MEMBRANE INSTALLATION

3.4.1. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

3.5 FLOOR TILE INSTALLATION

3.5.1. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.

3.5.1.1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.

3.5.1.1.1. Tile floors composed of tiles 8 by 8 inches or larger.

3.5.2. Joint Widths: Install tile on floors with 1/4 inch joint widths.

3.5.3. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.5.4. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.6 WALL TILE INSTALLATION

3.6.1. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

3.6.2. Joint Widths: Install tile on walls with the following joint widths:

3.6.2.1. Glazed Base Tile: 1/4 inch.

3.7 CLEANING AND PROTECTING

3.7.1. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

3.7.1.1. Remove epoxy grout residue from tile as soon as possible.

3.7.1.2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.7.1.3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

3.7.2. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

3.7.3. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

3.7.4. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.8 FLOOR TILE INSTALLATION SCHEDULE

3.8.1. Tile Installation: Interior floor installation on concrete; thin-set mortar, epoxy grout; TCA F115 and ANSI A108.5.

3.8.1.1. Tile Type (CT-1): Colorbody Porcelain tile.

3.8.1.1.1 Size: 6 1/2-inch x 6 1/2-inch

3.8.1.2 Tile Type (CT-2): Colorbody Porcelain tile.

3.8.1.2.1 Size: 3-inch x 3-inch Mosaic mesh mounted (CT-2)

3.8.1.3 Thin-Set Mortar: Latex-porland cement mortar

3.8.1.4. Grout: Chemical-resistant, water-cleanable, tile-setting and grouting epoxy.

3.9 **BASE TILE INSTALLATION SCHEDULE**

3.9.1. Tile Installation: Interior wall installation over gypsum board on metal studs; organic adhesive; TCA W242 and ANSI A108.4.

3.9.1.1 Tile Type (B-3): Colorbody Porcelain cove base tile.

3.9.1.1.1 Size: 6-inch x 13-inch cove base.

3.9.1.2 Tile Type (B-4): Glazed Ceramic flat top cove base tile.

3.9.1.2.1 Size: 4 1/4-inch x 4 1/4-inch.

3.9.1.3. Grout: Polymer-modified sanded grout.

3.10 **WALL TILE INSTALLATION SCHEDULE**

3.10.1. Tile Installation: Interior wall installation over gypsum board on metal studs; organic adhesive; TCA W242 and ANSI A108.4.

3.10.1.1. Tile Type (W-4): Glazed Ceramic tile.

3.10.1.1.1 Size: 4 1/4-inch x 4 1/4-inch.

3.10.1.3. Grout: Polymer-modified sanded grout.

END OF SECTION 09310

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1. This Section includes acoustical panels and exposed suspension systems for ceilings including above-ceiling acoustical insulation.

1.2.2. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.3 **DEFINITIONS:**

1.3.1. CAC: Ceiling Attenuation Class.

1.3.2. LR: Light Reflectance coefficient.

1.3.3. NRC: Noise Reduction Coefficient.

1.4 **SUBMITTALS:**

1.4.1. Product Data: For each type of product indicated.

1.4.2. Samples for Initial Selection: For components with factory-applied color finishes.

1.4.3. Qualification Data: For testing agency.

1.4.4. Field quality-control test reports.

1.4.5. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.

1.4.6. Research/Evaluation Reports: For each acoustical panel ceiling and components.

1.4.7. Maintenance Data: For finishes to include in maintenance manuals.

1.5 **QUALITY ASSURANCE:**

1.5.1. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.

1.5.2. Source Limitations:

1.5.2.1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.

1.5.2.2. Suspension System: Obtain each type through one source from a single manufacturer.

1.6 **DELIVERY, STORAGE, AND HANDLING:**

1.6.1. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

1.6.2. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.6.3. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 **PROJECT CONDITIONS:**

1.7.1. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7.1.1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.8 **COORDINATION:**

1.8.1. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

2.1.1.1. Products: Subject to compliance with requirements, provide one of the products specified.

2.1.1.2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 **ACOUSTICAL PANELS, GENERAL:**

2.2.1. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

2.2.1.1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

2.2.2. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

2.2.2.1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.2.3. Panel-Based Antimicrobial Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial solution that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria.

2.3 **WATER-FELTED, MINERAL-BASE ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING:**

2.3.1. Products equivalent to the following:

2.3.1.1. Armstrong; Mesa #683

2.3.2. Classification: Provide panels complying with ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted; and pattern as follows:

2.3.2.1. Pattern: Fine Textured (Non-Directional).

2.3.3. Color: As selected from manufacturer's full range.

2.3.4. LR: Not less than 0.85.

2.3.5. NRC: Not less than 0.60.

2.3.6. CAC: Not less than 33.

2.3.7. Edge Detail: Square Edge

2.3.8. Thickness: 3/4 inch.

2.3.9. Size: 24 by 48 inches.

2.3.10 Antimicrobial Treatment: Panel based.

2.4 **METAL SUSPENSION SYSTEMS, GENERAL:**

2.4.1. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

2.4.2. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

2.4.3. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

2.4.4. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

2.4.4.1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2.4.4.2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- diameter wire.

2.5 **METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING:**

2.5.1. Products equivalent to the following:

2.5.1.1. Armstrong: Prelude XL15/16"

2.5.2. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch- wide metal caps on flanges.

2.5.2.1. Structural Classification: Intermediate-duty system.

2.5.2.2. End Condition of Cross Runners: Butt-edge type.

2.5.2.3. Face Design: Flat, flush.

2.5.2.4. Cap Material: Aluminum cold-rolled sheet.

2.5.2.5. Cap Finish: Painted in color as selected from manufacturer's full range.

2.6 **METAL EDGE MOLDINGS AND TRIM:**

2.6.1. Manufacturers:

2.6.1.1. Armstrong World Industries, Inc.

2.6.1.2. Chicago Metallic Corporation.

2.6.1.3. USG Interiors, Inc.

2.6.2. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with the following requirements:

2.6.2.1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for alloy and temper 6063-T5.

2.6.2.2. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.

2.6.2.3. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

2.6.2.3.1. Organic Coating: Thermosetting, primer/topcoat system with a minimum dry film thickness of 0.8 to 1.2 mils.

2.7 CEILING ACOUSTICAL INSULATION

2.7.1 Manufacturers equivalent to the following:

2.7.1.1 USG

2.7.2 Mineral Wool Acoustical Batts

2.7.2.1 Thickness: 3-inch.

PART 3 - EXECUTION

3.1 EXAMINATION:

3.1.1. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

3.1.2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION:

3.2.1. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 **INSTALLATION, GENERAL:**

3.3.1. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

3.3.2. Suspend ceiling hangers from building's structural members and as follows:

3.3.2.1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

3.3.2.2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3.3.2.3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3.3.2.4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

3.3.2.5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

3.3.2.5.1. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

3.3.2.5.2. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

3.3.2.5.3.1 Do not attach hangers to steel deck tabs.

3.3.2.5.4. Do not attach hangers to steel roof deck. Attach hangers to structural members.

3.3.2.5.5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

3.3.3. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

3.3.3.1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.3.3.2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

3.3.3.3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

3.3.4. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

3.3.5. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

3.3.5.1. Arrange directionally patterned acoustical panels as follows:

3.3.5.1.1. Install panels with pattern running in one direction parallel to short axis of space.

3.3.5.2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

3.3.5.3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.3.5.4. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.3.6 Install above ceiling acoustical bats in staggered rows with tight end and side joints.

3.4 **CLEANING:**

3.4.1. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09511

SECTION 09678 - RESILIENT FLOORING/WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS**:

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

1.2. **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.1. Resilient floor tile.

1.2.1.2 Resilient wall base.

1.2.1.3 Resilient flooring accessories.

1.2.1.4 Resilient carpet accessories.

1.3. **SUBMITTALS:**

1.3.1 General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1.3.2 Product data including all testing results, for each type of product specified.

1.3.3 Samples for verification purposes in manufacturer's standard sizes, but not less than 12 inches long, of each different color and pattern of product specified.

1.4. **QUALITY ASSURANCE:**

1.4.1 Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.4.2 Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.4.2.1 Critical Radiant Flux: 0.45 watts per sq cm or more per ASTM E 648.

1.4.2.2 Smoke Density: Less than 450 per ASTM E 662.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

1.5.2 Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F and 90 deg F.

1.5.3 Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.6. **PROJECT CONDITIONS:**

1.6.1 Maintain a minimum temperature of 70 deg F in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F.

1.6.2 Do not install products until they are at the same temperature as that of the space where they are to be installed.

1.6.3 Close spaces to traffic during installation of products specified in this Section.

1.7. **SEQUENCING AND SCHEDULING**:

1.7.1 Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1 Products: Subject to compliance with requirements, provide one of the products specified in each Product Data Sheets at end of this Section.

2.2 **FLOOR TILE:**

2.2.1. Luxury Vinyl Tile: Product complying with ASTM F 1700, Class III, Type B – Embossed Surface and requirements specified in the Resilient Floor Tile Product Data Sheet at end of this section.

2.3. **RESILIENT WALL BASE:**

2.3.1 Rubber Wall Base: Products complying with FS SS-W-40, Type I, and requirements specified in the Rubber Wall Base Product Data Sheet at end of this Section.

2.4. **RESILIENT ACCESSORIES:**

2.4.1 Rubber Accessories: Products complying with requirements specified in Rubber Accessory Product Data Sheet at end of this Section.

2.5. **INSTALLATION ACCESSORIES:**

2.5.1 Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.

2.5.2 Trowelable Underlayments and Patching Compounds: Latex- modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

2.5.3 Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.

3.2. **PREPARATION:**

3.2.1 General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.

3.2.2 Use trowelable leveling and patching compounds per manufacturers directions to fill cracks, holes, and depressions in substrates.

3.2.3 Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

3.2.4 Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.2.5 Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3. **INSTALLATION:**

3.3.1 General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.

3.3.2 Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

3.3.2.1 Install inside and exterior corners before installing straight pieces.

3.3.3 Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

3.4. **CLEANING AND PROTECTION:**

3.4.1 Perform the following operations immediately after completing installation:

3.4.1.1 Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.

3.4.1.2 Sweep or vacuum floor thoroughly.

3.4.1.3 Do not wash floor until after time period recommended by manufacturer.

3.4.1.4 Damp-mop resilient accessories to remove black marks and soil.

3.4.2 Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.

3.4.3 Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products using method recommended by manufacturer.

Product Data Sheet LVT-1/LVT-2

A. Resilient Floor Tile Designation : LVT-1/LVT-2

B. Performance Requirements: Layered construction consisting of a tough, clear, vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.

C. Gauge: .120-inch minimum.

D. Wear Layer: 020-inch minimum.

E. Size: To be selected from manufacturer's full size range.

F. Available Product: Parterre 3MM Tile and Plank or Equal.

G. Color: To be selected from Manufacturer's full color range.

Product Data Sheet VCT-1

H. Resilient Floor Tile Designation : VCT-1

I. Performance Requirements: Through color/pattern wear layer with fast start factory finish.

J. Wear Layer: 1/8 inch minimum.

K. Size: 12" x 12" square.

L. Available Product: Armstrong Standard Excelon Imperial Texture or Equal.

M. Color: To be selected from Manufacturer's full color range.

Product Data Sheet B-2

A. Rubber Wall Base Designation: B-2

B. Performance Requirements: Standard Specification F-1861 Type TP; Group 1.

C. Gauge: 1/8”

D. Size: 4” high by 120’ roll

E. Style: Coved

F. Corners: Pre-formed inside and outside corners

G. Available Product: Roppe 700 Series or Equal.

H. Color: to be selected from Manufacturer’s full color range.

END OF SECTION 09678

SECTION 09680 – CARPET

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1. This Section includes carpet and installation.

1.2.2. Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1. Division 3 Sections for curing compounds and other concrete treatments compatibility with carpet and carpet cushion adhesives.

1.2.2.2. Division 9 Section "Resilient Floor/Wall Base and Accessories" for materials and installation.

1.3. **SUBMITTALS:**

1.3.1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2. Product Data for each type of carpet material and installation accessory specified. Submit manufacturer's printed data on physical characteristics, durability, fade resistance, and fire-test-response characteristics. Submit methods of installation for each type of substrate.

1.3.3. Shop Drawings showing columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet. Indicate the following:

1.3.3.1. Carpet type, color, and dye lot.

1.3.3.2. Locations, if dye lot changes occur.

1.3.3.3. Seam locations, types, and methods.

1.3.3.4. Type of subfloor.

1.3.3.5. Type of installation.

1.3.3.6. Pattern type, repeat size, location, direction, and starting point.

1.3.3.7. Pile direction.

1.3.3.8. Type, color, and location of insets and borders.

1.3.3.9. Type, color, and location of edge, transition, and other accessory strips.

1.3.3.10. Transition details to other flooring materials.

1.3.4. Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material to be used for the Work. Label each sample with manufacturer's name, material type, color, pattern, and designation indicated on Drawings and carpet schedule. Submit the following:

1.3.4.1. 12" x 18" inch Samples of each type of carpet material required.

1.3.4.2. 12-inch Samples of each type of exposed edge stripping and accessory item.

1.3.5. Schedule of carpet using same room designations indicated on Drawings.

1.3.6. Maintenance data for carpet to include in the operation and maintenance manual specified in Division 1. Include the following:

1.3.6.1. Methods for maintaining carpet including manufacturer's recommended frequency for maintaining carpet.

1.3.6.2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance. Include cleaning and stain-removal products and procedures.

1.4. **QUALITY ASSURANCE:**

1.4.1. Installer Qualifications: Engage an experienced Installer who is certified by the Floor Covering Installation Board (FCIB) or who can demonstrate compliance with FCIB certification program requirements.

1.4.2. Single-Source Responsibility: Obtain each type of carpet from one source and by a single manufacturer.

1.4.3. Carpet Fire-Test-Response Characteristics: Provide carpet with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet with appropriate markings of applicable testing and inspecting agency.

1.4.3.1. Surface Flammability: Passes CPSC 16 CFR, Part 1630.

1.4.3.2. Flame Spread: 25 or less per ASTM E 84.

1.4.3.3. Smoke Developed: 450 or less per ASTM E 84.

1.4.4. Mockups: Prior to installing carpet, construct mockups for each type of carpet and installation method required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1.4.4.1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect or Owner.

1.4.4.2. Notify Architect or Owner one week in advance of the dates and times when mockups will be constructed.

1.4.4.3. Demonstrate the proposed range of aesthetic effects and workmanship.

1.4.4.4. Obtain Architect's approval of mockups before start of final unit of Work.

1.4.4.5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

1.4.4.5.1 Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.5. **DELIVERY, STORAGE, AND HANDLING:**

1.5.1. General: Comply with the Carpet and Rug Institute's CRI 104, Section 5: "Storage and Handling."

1.5.2. Deliver materials to Project site in original factory wrappings and containers, labeled with identification of manufacturer, brand name, and lot number.

1.5.3. Store materials on-site in original undamaged packages, inside well-ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, with continuous blocking off ground.

1.6. **PROJECT CONDITIONS:**

1.6.1. General: Comply with CRI 104, Section 6: "Site Conditions."

1.6.2. Space Enclosure and Environmental Limitations: Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.6.3. Subfloor Moisture Conditions: Moisture emission rate of not more than 3 lb/1000 sq. ft./24 hours when tested by calcium chloride moisture test in compliance with CRI 104, 6.2.1, with subfloor temperatures not less than 55 deg F.

1.6.4. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHydrion paper is applied.

1.7. **WARRANTY:**

1.7.1. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

1.7.2. Special Carpet Warranty: Submit a written warranty executed by carpet manufacturer and Installer agreeing to repair or replace carpet that does not meet requirements or that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

1.7.3. Warranty Period: 10 years from dated of substantial completion.

1.8. **EXTRA MATERIALS:**

1.8.1. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

1.8.1.1. Carpet: Before installation begins, furnish quantity of full-width units equal to five (5) percent of amount installed.

PART 2 - PRODUCTS

2.1. **CARPET:**

2.1.1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the products specified in each carpet Product Data sheet at end of this Section.

2.2. **INSTALLATION ACCESSORIES:**

2.2.1. Concrete-Slab Primer: Nonstaining type as recommended by the following:

2.2.1.1. Carpet manufacturer.

2.2.2. Trowelable Underlayments and Patching Compounds: As recommended by the following:

2.2.2.1. Carpet manufacturer.

2.2.3. Adhesives: Water-resistant, mildew-resistant, low V.O.C nonstaining type to suit products and subfloor conditions indicated and to comply with flammability requirements for installed carpet as recommended by the following:

2.2.3.1. Carpet manufacturer.

2.2.4. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1. Examine subfloors and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting performance of carpet. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.1.2. Verify that subfloors and conditions are satisfactory for carpet installation and comply with requirements specified in this Section and those of the following:

3.1.2.1. Carpet manufacturer.

3.2. **PREPARATION:**

3.2.1. General: Comply with carpet manufacturer's installation recommendations to prepare substrates indicated to receive carpet installation.

3.2.2. Level subfloor within 1/4 inch in 10 feet, noncumulative, in all directions. Sand or grind protrusions, bumps, and ridges. Patch and repair cracks and rough areas. Fill depressions.

3.2.2.1. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by the following:

3.2.2.1.1 Carpet manufacturer.

3.2.3. Remove subfloor coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.

3.2.4. Broom or vacuum clean subfloors to be covered with carpet. Following cleaning, examine subfloors for moisture, alkaline salts, carbonation, or dust.

3.2.5. Concrete-Subfloor Preparation: Apply concrete-slab primer/sealer, according to manufacturer's directions, where recommended by the following:

3.2.5.1. Carpet manufacturer.

3.3. **INSTALLATION:**

3.3.1. Direct Glue-Down Installation: Comply with CRI 104, Section 8: "Direct Glue-Down."

3.3.2. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 10: "Attached Cushion."

3.3.3. Comply with Drawing I-1 on direction carpet is to be laid. Comply with manufacturers recommendations for seam locations maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position. Do not bridge building expansion joints with continuous carpet.

3.3.4. Where demountable partitions (such as resident room dividing partitions) or other items are indicated for installation on top of finished carpet floor, install carpet before installation of these items.

3.3.5. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

3.3.6. Extend carpet into toe spaces, door reveals, closets, open- bottomed obstructions, removable flanges, alcoves, and similar openings.

3.3.7. Install pattern parallel to walls and borders. Carpet pattern must match within 1/2".

3.4. **CLEANING:**

3.4.1. Perform the following operations immediately after completing installation.

3.4.1.1. Remove visible adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.

3.4.1.2. Remove protruding yarns from carpet surface.

3.4.1.3. Vacuum carpet using commercial machine with face-beater element.

3.5. **PROTECTION:**

3.5.1. General: Comply with CRI 104, Section 15: "Protection of Indoor Installation."

3.5.2. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure carpet is without damage or deterioration at the time of Substantial Completion.

3.6. **PRODUCT DATA SHEETS:**

3.6.1 See following pages.

PRODUCT DATA SHEET CPT-1:

A. Carpet Designation: CPT-1.

B. Fiber Content: 100% nylon

C. Surface Texture: Dense Textured Loop

D. Pile Thickness: 1/2" max per ADA code compliance.

E. Protective Treatments: Soil Protection / Stain Resistance

F. Size: 24" x 24" Modular nominal

L. Color and Pattern: To be selected from Manufacturer's full range.

M. Available Products:

1. Shaw Contract
2. Interface
3. Mowhawk Group
4. Atlas Carpet Mills
5. Patcraft Commercial
6. Masland Contract

N. Allowance: $32 per yard.

PRODUCT DATA SHEET CPT-2:

A. Carpet Designation: CPT-2.

B. Fiber Content: 100% nylon

C. Surface Texture: Dense Textured Loop

D. Pile Thickness: 1/2" max per ADA code compliance.

E. Protective Treatments: Soil Protection / Stain Resistance

F. Size: 24" x 24" Modular nominal

L. Color and Pattern: To be selected from Manufacturer's full range.

M. Available Products:

7. Shaw Contract
8. Interface
9. Mowhawk Group
10. Atlas Carpet Mills
11. Patcraft Commercial
12. Masland Contract

N. Allowance: $32 per yard.

END OF SECTION 09680

SECTION 09911 - EXTERIOR PAINTING

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1.2.1.1. Galvanized hollow metal frames and doors.

1.2.1.2. Galvanized steel lintels.

1.2.1.3. Steel canopy columns and overall framing.

1.2.1.4. Steel canopy underside of exposed roof decking.

1.2.1.5. Galvanized steel canopy anchorage protective plate.

1.2.1.6. Galvanized steel bollards.

1.2.2. Related Sections include the following:

1.2.2.1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.

1.2.2.2. Division 9 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 **SUBMITTALS:**

1.3.1. Product Data: For each type of product indicated.

1.3.2. Product List: For each product indicated, include the following:

1.4 **QUALITY ASSURANCE:**

1.4.1. MPI Standards:

1.4.1.1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

1.4.1.2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.5 **DELIVERY, STORAGE, AND HANDLING:**

1.5.1. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1.5.1.1. Maintain containers in clean condition, free of foreign materials and residue.

1.5.1.2. Remove rags and waste from storage areas daily.

1.6 **PROJECT CONDITIONS:**

1.6.1. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

1.6.2. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 – PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.1.1.1. Benjamin Moore & Co.

2.1.1.2. Davis Paint Company.

2.1.1.3. Duron, Inc.

2.1.1.4. ICI Paints.

2.1.1.5. Sherwin-Williams Company (The).

2.2 **PAINT, GENERAL:**

2.2.1. Material Compatibility:

2.2.1.1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2.2.1.2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.2.2. Colors: As selected by Architect from manufacturer's full range.

2.3 **PRIMERS/SEALERS:**

2.3.1. Alkali-Resistant Primer:

2.3.1.1. VOC Content: E Range of E2.

2.3.2 Epoxy powder primer (hollow metal frames/doors)

2.4 **METAL PRIMERS:**

2.4.1. Waterborne Galvanized-Metal Primer:

2.4.1.1. VOC Content: E Range of E1.

2.4.1.2. Environmental Performance Rating: EPR 1.

2.5 **EXTERIOR ALKYD PAINTS:**

2.5.1. Exterior Alkyd Enamel (Flat): (Gloss Level 1).

2.5.1.1. VOC Content: E Range of E1.

2.6 **EXTERIOR FINISH COAT (HOLLOW METAL FRAMES/DOORS):**

2.6.1 Ultrathane polyurethane

PART 3 – EXECUTION

3.1 **EXAMINATION:**

3.1.1. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

3.1.2. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

3.1.2.1. Gypsum Board: 12 percent.

3.1.3. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

3.1.4. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.1.4.1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 **PREPARATION:**

3.2.1. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

3.2.2. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

3.2.2.1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.2.2.2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

3.2.3. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

3.2.3.1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

3.2.4. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 **APPLICATION:**

3.3.1. Apply paints according to manufacturer's written instructions.

3.3.1.1. Use applicators and techniques suited for paint and substrate indicated.

3.3.1.2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3.3.2. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3.3. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

3.3.4. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 **FIELD QUALITY CONTROL:**

3.4.1. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

3.4.1.1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

3.4.1.2. Testing agency will perform tests for compliance of paint materials with product requirements.

3.4.2.3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 **CLEANING AND PROTECTION:**

3.5.1. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

3.5.2. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.5.3. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

3.5.4. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 **EXTERIOR PAINTING SCHEDULE:**

3.6.1. Galvanized-Metal Substrates:

3.6.1.1. Alkyd System: MPI EXT 5.3B.

3.6.1.1.1. Prime Coat: Cementitious galvanized-metal primer.

3.6.1.1.2. Intermediate Coat: Exterior alkyd enamel matching topcoat.

3.6.1.1.3. Topcoat: Exterior alkyd enamel (semigloss).

3.6.2 Galvanized Hollow Metal Substrates (frames/doors):

3.6.2.1 Galvanized frame/door (by manufacturer)

3.6.2.2 Epoxy powder primer

3.6.2.3 Ultrathane polyurethane top coat.

END OF SECTION 09911

SECTION 09912 - INTERIOR PAINTING

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1.2.1.1. Galvanized metal.

1.2.1.2. Exposed wood architectural woodwork.

1.2.1.3. Gypsum board walls and ceilings.

1.2.2. Related Sections include the following:

1.2.2.1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.

1.2.2.2. Division 9 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.3 **SUBMITTALS:**

1.3.1. Product Data: For each type of product indicated.

1.3.2. Product List: For each product indicated, include the following:

1.3.2.1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.3.2.2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 **QUALITY ASSURANCE:**

1.4.1. MPI Standards:

1.4.1.1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

1.4.1.2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.4.2. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.4.2.1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

1.4.2.1.1. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.

1.4.2.1.2. Other Items: Architect will designate items or areas required.

1.4.2.2. Apply benchmark samples after permanent lighting and other environmental services have been activated.

1.4.2.3. Final approval of color selections will be based on benchmark samples.

1.4.2.3.1. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 **DELIVERY, STORAGE, AND HANDLING:**

1.4.1. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1.4.1.1. Maintain containers in clean condition, free of foreign materials and residue.

1.4.1.2. Remove rags and waste from storage areas daily.

1.5 **PROJECT CONDITIONS:**

1.5.1. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

1.5.2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.6 **EXTRA MATERIALS:**

1.6.1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1.6.1.1. Quantity: Furnish an additional five (5) percent, but not less than 4 gal. of each material and color applied.

PART 2 – PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. Duron, Inc.
3. ICI Paints.
4. Sherwin-Williams Company (The).

2.2 **PAINT, GENERAL:**

2.2.1. Material Compatibility:

2.2.1.1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2.2.1.2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.2.2. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:

2.2.2.1. Flat Paints and Coatings: VOC content of not more than 50 g/L.

2.2.2.2. Nonflat Paints and Coatings: VOC content of not more than 150 g/L.

2.2.2.3. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2.2.2.4. Restricted Components: Paints and coatings shall not contain any of the following:

a. Acrolein.
b. Acrylonitrile.
c. Antimony.
d. Benzene.
e. Butyl benzyl phthalate.
f. Cadmium.
g. Di (2-ethylhexyl) phthalate.
h. Di-n-butyl phthalate.
i. Di-n-octyl phthalate.
j. 1,2-dichlorobenzene.
k. Diethyl phthalate.
l. Dimethyl phthalate.
m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

2.2.3. Colors: As selected by Architect from manufacturer's full range.

2.3 **PRIMERS/SEALERS:**

2.3.1. Interior Latex Primer/Sealer: MPI #50.

2.3.1.1. VOC Content: E Range of E2.

2.3.1.2. Environmental Performance Rating: EPR 2.

2.4 **METAL PRIMERS:**

2.4.1. Cementitious Galvanized-Metal Primer: MPI #26.

2.4.1.1. VOC Content: E Range of E1.

2.5 **ALKYD PAINTS:**

2.5.1. Interior Alkyd (Eggshell): MPI #51 (Gloss Level 3).

2.5.1.1. VOC Content: E Range of E1.

PART 3 – EXECUTION

3.1 **EXAMINATION:**

3.1.1. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

3.1.2. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

3.1.2.1. Wood: 15 percent.

3.1.2.2. Gypsum Board: 12 percent.

3.1.3. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

3.1.4. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.1.4.1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 **PREPARATION:**

3.2.1. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

3.2.2. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

3.2.2.1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.2.2.2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

3.2.3. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

3.2.3.1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

3.2.4. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

3.2.5. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.2.6. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 **APPLICATION:**

3.3.1. Apply paints according to manufacturer's written instructions.

3.3.1.1. Use applicators and techniques suited for paint and substrate indicated.

3.3.1.2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3.3.1.3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

3.3.2. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3.3. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

3.3.4. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 **FIELD QUALITY CONTROL:**

3.4.1. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

3.4.1.1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

3.4.1.2. Testing agency will perform tests for compliance with product requirements.

3.4.1.3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 **CLEANING AND PROTECTION:**

3.5.1. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

3.5.2. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.5.3. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

3.5.4. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 **INTERIOR PAINTING SCHEDULE:**

3.6.1. Steel Substrates:

3.6.1.1. Alkyd System: MPI INT 5.1E.

3.6.1.1.1. Prime Coat: Quick-drying alkyd metal primer.

3.6.1.1.2. Intermediate Coat: Interior alkyd matching topcoat.

3.6.1.1.3. Topcoat: Interior alkyd (eggshell).

3.6.2. Galvanized-Metal Substrates:

3.6.2.1. Alkyd System: MPI INT 5.3C.

3.6.2.1.1. Prime Coat: Cementitious galvanized-metal primer.

3.6.2.1.2. Intermediate Coat: Interior alkyd matching topcoat.

3.6.2.1.3. Topcoat: Interior alkyd (eggshell).

3.6.3. Gypsum Board Substrates:

3.6.3.1. Alkyd Over Latex Primer System: MPI INT 9.2C.

3.6.3.1.1. Prime Coat: Interior latex primer/sealer.

3.6.3.1.2. Intermediate Coat: Interior alkyd matching topcoat.

3.6.3.1.3. Topcoat: Interior alkyd (eggshell).

END OF SECTION 09912

SECTION 09930 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS:**

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 **SUMMARY:**

1.2.1 This Section includes surface preparation and the application of wood finishes on the following substrates:

1.2.1.1 Interior Substrates:

1.2.1.1.1 Wood stile and rail doors/Ticketing wood framing and double-hung shutters.

1.2.1.1.2 Wood wall paneling.

1.2.1.1.3 Exposed dimension lumber (rough carpentry).

1.2.2 Related Sections include the following:

1.2.2.1 Division 09 Section "Exterior Painting" for surface preparation and application of standard paint systems on exterior substrates.

1.2.2.2 Division 09 Section "Interior Painting" for surface preparation and application of standard paint systems on interior substrates.

1.3 **SUBMITTALS:**

1.3.1 Product Data: For each type of product indicated.

1.3.2 Samples for Initial Selection: For each type of product indicated.

1.3.3 Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.

1.3.3.1 Submit Samples on representative samples of actual wood substrates, 8-inches square.

1.3.3.2 Label each Sample for location and application area.

1.3.4 Product List: For each product indicated, include the following:

1.3.4.1 Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.3.4.2 Printout of MPI's current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.

1.4 **QUALITY ASSURANCE:**

1.4.1 MPI Standards:

1.4.1.1 Products: Complying with MPI standards indicated and listed in its "MPI Approved Products List."

1.4.1.2 Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.

1.4.2 Mockups: Apply benchmark samples of each finish system indicated and each color selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.4.2.1 Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.

1.4.2.1.1 Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.

1.4.2.1.2 Other Items: Architect will designate items or areas required.

1.4.2.2 Final approval of stain color selections will be based on benchmark samples.

1.4.2.2.1 If preliminary stain color selections are not approved, apply additional benchmark samples of additional stain colors selected by Architect at no added cost to Owner.

1.5 **DELIVERY, STORAGE, AND HANDLING:**

1.5.1 Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1.5.1.1 Maintain containers in clean condition, free of foreign materials and residue.

1.5.1.2 Remove rags and waste from storage areas daily.

1.6 **PROJECT CONDITIONS:**

1.6.1. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

1.6.2 Do not apply exterior finishes in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

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

2.1.1.1 Benjamin Moore & Co.

2.1.1.1 Cabot Incorporated, Samuel.

2.1.1.2 Duron, Inc.

2.1.1.3 ICI Paints.

2.1.1.4 M.A.B. Paints.

2.1.1.5 PPG Architectural Finishes, Inc.

2.1.1.6 Sherwin-Williams Company (The)

2.2 MATERIALS, GENERAL:

2.2.1 Material Compatibility

2.2.1.1 Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2.2.1.2 For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

2.2.2 Stain Colors: As selected by Architect from manufacturer's full range.

2.3 **WOOD FILLERS:**

2.3.1 Wood Filler Paste: MPI #91.

2.3.1.1 VOC Content: E Range of E1.

2.4 **PRIMERS AND SEALERS:**

2.4.1 Exterior Oil Wood Primer: MPI #7.

2.4.1.1 VOC Content: E Range of E2.

2.4.2 Wood Preservative: MPI #37.

2.4.2.1 VOC Content: E Range of [**E1**] [**E3**].

2.4.3 Lacquer Sanding Sealer: MPI #84.

2.4.3.1 VOC Content: E Range of E2.

2.4.4 Shellac: MPI #88.

2.4.4.1 VOC Content: E Range of E2.

2.5 **STAINS:**

2.5.1 Exterior Semitransparent Stain (Solvent Based):

2.5.1.1 PPG Proluxe Cetol Log and Siding Stain.

2.5.1.2 VOC Content: E Range of E2.

2.5.2 Interior Wood Stain (Semitransparent): MPI #90.

2.5.2.1 VOC Content: E Range of E2.

2.6 **VARNISHES:**

2.6.1 Interior Varnish (Flat): MPI #73, Gloss Level 1, alkyd type.

2.6.2.1. VOC Content: E Range of [**E1**] [**E2**] [**E3**].

PART 3 -EXECUTION:

3.1 **EXAMINATION:**

3.1.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

3.1.1.1 Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.

3.1.1.2 Verify compatibility with and suitability of substrates.

3.1.1.3 Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.1.1.4 Beginning application of finish system constitutes Contractor's acceptance of substrate and condition.

3.2 **PREPARATION:**

3.2.1 Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

3.2.2 Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

3.2.2.1 After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.

3.2.3 Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.

3.2.3.1 Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

3.2.3.2 Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

3.2.3.3 Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.

3.2.4 Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.

3.3 **APPLICATION:**

3.3.1 Apply finishes according to manufacturer's written instructions.

3.3.1.1 Use applicators and techniques suited for finish and substrate indicated.

3.3.1.2 Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

3.3.2 Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 **FIELD QUALITY CONTROL:**

3.4.1 Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when finishes are being applied:

3.4.1.1 Owner will engage the services of a qualified testing agency to sample finish materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

3.4.1.2 Testing agency will perform tests for compliance with product requirements.

3.4.1.3 Owner may direct Contractor to stop applying finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces if, on refinishing with complying materials, the two finishes are incompatible.

3.5 **CLEANING AND PROTECTION:**

3.5.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

3.5.2 After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.5.3 Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

3.5.4 At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.6 **INTERIOR WOOD-FINISH-SYSTEM SCHEDULE:**

3.6.1 Exposed Rough Carpentry Substrates:

3.6.1.1 Polyurethane Varnish Over Stain System: MPI INT 6.2J.

3.6.1.1.1 Stain Coat: Interior wood stain (semitransparent).

3.6.1.1.2 Two Finish Coats: Interior, oil-modified, clear urethane (satin).

3.6.2 Finish Carpentry Substrates:

3.6.2.1 Polyurethane Varnish Over Stain System: MPI INT 6.3E.

3.6.2.1.1 Stain Coat: Interior wood stain (semi-transparent).

3.6.2.1.2 Two Finish Coats: Interior, oil-modified, clear urethane (satin).

END OF SECTION 099300

SECTION 10155 - TOILET COMPARTMENTS

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1. This Section includes solid-polymer units as follows:

1.2.1.1. Toilet Enclosures: Floor and Ceiling anchored.

1.2.2. Related Sections include the following:

1.2.2.1 Division 6 “Rough Carpentry” for overhead support of floor-and-ceiling anchored units.

1.2.2.2. Division 10 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, and similar accessories.

1.3 **SUBMITTALS**

1.3.1. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1.3.2. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.3.2.1. Show locations of cutouts for compartment-mounted toilet accessories.

1.3.2.2. Show locations of reinforcements for compartment-mounted grab bars.

1.4 **QUALITY ASSURANCE**

1.4.1. Comply with requirements in CID-A-A-60003, "Partitions, Toilets, Complete."

1.5 **PROJECT CONDITIONS**

1.5.1. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.

2.1 **SOLID-POLYMER UNITS**

2.1.1. 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:

1. Ampco by AJW.
2. ASI/Global Partitions Corp.
3. General Partitions Mfg. Corp.
4. Knickerbocker Partitions Corp.
5. Scranton Products, Inc.

2.1.2. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1-inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

2.1.2.1 Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range of colors and patterns.

2.1.3. Pilaster Shoes and Sleeves Caps: Manufacturer's standard design; stainless steel.

2.1.4. Brackets (Fittings):

2.1.4.1. Stirrup Type: Ear or U-brackets, stainless steel.

2.1.4.2 Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.1.5 Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.

2.1.6. Overhead Cross Bracing for Ceiling-Hung Units: As recommended by manufacturer and fabricated from solid polymer.

2.2 **ACCESSORIES**

2.2.1. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

2.2.1.1. Material: Stainless steel.

2.2.2. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 **FABRICATION**

2.3.1. Floor-and-Ceiling Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

2.3.2. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities.

2.3.2.1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.

2.3.2.2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.

2.3.2.3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.

2.3.2.4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.

2.3.2.5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 – EXECUTION

3.1 INSTALLATION

3.1.1. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

3.1.1.1. Maximum Clearances:

3.1.1.1.1 Pilasters and Panels: 1/2 inch.

3.1.1.1.2 Panels and Walls: 1 inch.

3.1.2 Stirrup Brackets: Secure panels to walls and to pilasters with not less than two brackets attached near top and bottom of panel.

3.1.2.1 Locate wall brackets so holes for wall anchors occur in masonry or tile joints.

3.1.2.1.1 Align brackets at pilasters with brackets at walls.

3.1.3 Floor-and-Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.

3.2 ADJUSTING

3.2.1. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10155

SECTION 10200 - LOUVERS AND VENTS

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

1.2.1. This Section includes the following:

1.2.1.1. Fixed, extruded-aluminum gable end louvers.

1.2.2. Related Sections include the following:

1.2.2.1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.3 **DEFINITIONS**

1.3.1. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

1.3.2. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.4 **PERFORMANCE REQUIREMENTS**

1.4.1. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.

1.4.1.1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

1.4.2. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.4.2.1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.4.3. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.5 SUBMITTALS

1.5.1. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

1.5.2. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

1.5.2.1. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5.2.2. Wiring Diagrams: Power, signal, and control wiring for motorized adjustable louvers.

1.5.3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.6 QUALITY ASSURANCE

1.6.1. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

1.6.2. Welding: Qualify procedures and personnel according to the following:

1.6.2.1. AWS D1.2, "Structural Welding Code--Aluminum."

1.6.3. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.7 **PROJECT CONDITIONS**

1.7.1. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7.1.1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.1.1.1. Louvers:

1. Airolite Company (The).
2. Construction Specialties, Inc.
3. Ruskin Company; Tomkins PLC.

2.1.2 Basis-of-Design Product: The design for each louver is based on the product information noted in Drawings. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 **MATERIALS**

2.2.1. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.

2.2.2. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

2.2.3. Aluminum Castings: ASTM B 26/B 26M, alloy 319.

2.2.4. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

2.2.4.1. Use types and sizes to suit unit installation conditions.

2.2.4.2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.

2.3 FABRICATION, GENERAL

2.3.1. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

2.3.2. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

2.3.2.1. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

2.3.3. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

2.3.4. Maintain equal louver blade spacing to produce uniform appearance.

2.3.5. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

2.3.5.1. Frame Type: Channel with side extension for anchorage, unless otherwise indicated.

2.3.6. Include supports, anchorages, and accessories required for complete assembly.

2.3.7. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.

2.3.7.1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

2.3.8. Where indicated, provide extended sills for recessed louvers.

2.3.9. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3.10. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

2.4.1. Horizontal, Sightproof, Drainable-Blade Louver:

2.4.1.1. Basis-of-Design Product: Ruskin; Thinline/Sightproof/Model #ELF211 or a comparable product of one of the following:

1. The Airolite Company
2. Arrow United Industries
3. Construction Specialties, Inc.

2.4.1.2. Louver Depth: 6 inches unless otherwise indicated.

2.4.1.3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.060 inch for blades.

2.4.1.4. Mullion Type: Exposed.

2.4.1.5. Performance Requirements:

2.4.1.5.1. Free Area: Not less than 8.3 sq. ft. for 48-inch- wide by 48-inch- high louver.

2.4.1.5.2. Air Performance: Not more than 0.10-inch wg static pressure drop at 550-fpm free-area velocity.

2.5 FINISHES, GENERAL

2.5.1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.5.2. Finish louvers after assembly.

2.6 ALUMINUM FINISHES

2.6.1. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.

2.6.2 Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

2.6.2.1. Color: As selected by Architect from the full range of industry colors and color densities.

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

3.1.1.1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.2.1. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

3.3.1. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

3.3.2. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

3.3.3. Form closely fitted joints with exposed connections accurately located and secured.

3.3.4. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

3.3.5. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

3.3.6. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

3.4.1. Clean exposed surfaces of louvers that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

3.4.2. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

3.4.3. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

3.4.3.1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 10200

SECTION 10280 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes toilet and bath accessory items as scheduled.

1.3. **SUBMITTALS:**

1.3.1 General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.

1.3.2 Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.

1.3.3 Schedule indicating types, quantities, sizes, and installation locations (by room) for each toilet accessory item to be provided for project.

1.3.4 Setting drawings where cutouts are required in other work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.

1.3.5 Maintenance instructions including replaceable parts and service recommendations.

1.4. **QUALITY ASSURANCE:**

1.4.1 Inserts and Anchorages: Furnish accessory manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other work to avoid delay.

1.5. **PROJECT CONDITIONS:**

1.5.1 Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

PART 2 - PRODUCTS

2.1. **ACCEPTABLE MANUFACTURERS:**

2.1.1 Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:

American Specialties, Inc.
Bobrick Washroom Equipment, Inc.
Bradley Corporation.
Basco.
General Accessory Manufacturing Co.
McKinney/Parker.
Bradex

2.2. **MATERIALS, GENERAL:**

2.2.1 Stainless Steel: ASTM A666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

2.2.2 Chromium Plating: ASTM B 456, Service condition number SC 2 (moderate service).

2.2.3 Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

2.2.4 Fasteners: Screws, bolts, and other devices of same material as accessory unit, and tamper-and-theft resistant where exposed or of galvanized steel where concealed.

2.9 **FABRICATION:**

2.9.1 General: Only a maximum 1-1/2 inch diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.

2.9.2 Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

2.9.3 Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

2.9.4 Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1. **INSTALLATION:**

3.1.1 Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.

3.1.2 Install grab bars to withstand a downward load of at least 250 lbs, complying with ASTM F 446.

3.2. **ADJUSTING AND CLEANING:**

3.2.1 Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

3.2.2 Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

3.3. **TOILET ACCESSORIES SCHEDULE:**

3.3.1 General: Provide toilet accessories for locations as indicated in the Drawings to comply with requirements of Section "Toilet and Bath Accessories," indicated on Drawing A10.2.

END OF SECTION 10800

SECTION 10350 - FLAGPOLES

PART 1 – GENERAL

1.1 **DESCRIPTION:**

1.1.1. Work included:

1.1.1.1. Aluminum Flagpoles.

1.1.2. Related work specified elsewhere:

1.1.2.1. Excavation and Fill: Section 02200.

1.1.2.2. Concrete: Section 03300.

1.2 **REFERENCE STANDARDS**:

1.2.1. Aluminum Association (AA) Publication

1.2.1.1. Designation System for Aluminum Finishes (#45-97).

1.2.2. American Society for Testing and Materials (ASTM) Publications:

1.2.2.1. Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles, and Tubes (B 221-00)

1.2.3. Federal Specifications (FS):

1.2.3.1. Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant (TT-P-664D “94”)

1.3 **SYSTEM DESCRITION:**

1.3.1. Design Requirements: Installed flagpoles shall withstand minimum wind velocity of 115 mph, unflagged.

1.4 **SUBMITTALS:**

1.4.1. Manufacturer’s complete product information.

1.4.2. Shop Drawings: Details of flagpoles and bases, showing general layout, and complete anchoring and support systems.

1.4.3. Samples: Finished pole section and fittings.

PART 2 - PRODUCTS

2.1 **MATERIALS**:

2.1.1 Aluminum: ASTM B 221, seamless extruded aluminum tubing, alloy 6063-T6, heat-treated and age-hardened. Minimum wall thickness of 3/16-inch (0.1875-inch), minimum tensile strength 35,000 psi and a yield point of 30,000 psi.

2.1.2 Use heavy pipe sizes if required to meet wind load requirements.

2.1.3. Heights:

2.1.3.1 One (1) Thirty-Five (35) foot

2.1.3.2 Two (2) Thirty (30) foot

2.2 **FABRICATION**:

2.2.1 Cone tapered aluminum flag poles: Construct pole and ship to site in one piece if possible. If more than one piece is necessary, provide snug-fitting, precision joints with self-aligning, internal splicing sleeve for weather-tight, hairline joint.

2.2.2 Foundation Tube for Ground –set Flagpoles: Minimum 16 gauge galvanized corrugated steel tube, with welded steel bottom base and support plate, lighting ground spike, and steel centering wedges. Provide loose hardwood wedges at top for plumbing pole after erection. Galvanize steel parts after assembly, including foundation tube.

2.3 **FINISH**:

2.3.1 Aluminum Flagpoles: Very fine, non-directional, mechanical polish, finish as follows:

2.3.1.1. Factory-applied anodic coating, Architectural Class I (0.7 mill or thicker), AA designation M10-C22-A41, black.

2.4 **ACCESSORIES**:

2.4.1 Aluminum Fittings:

2.4.1.1. Ball: Flush seam 14 gauge spun aluminum to match pole. Size as shown or, if not shown, to match pole butt diameter.

2.4.1.2. Truck: Aluminum ball-bearing, non-fouling, revolving, single-truck assembly.

2.4.1.3. Cleats: Two (2) 9-inch cast aluminum cleats and aluminum fastenings.

2.4.2. Halyards: 3/8”-inch (No. 12) continuous braided nylon with steel or bronze core, one per flagpole.

2.4.3. Swivel Snaps: Chromium-plated bronze, two per halyard.

2.4.4. Concrete: Minimum 3,000 psi. Refer to Section 03300.

PART 3 – EXECUTION

3.1 **PREPARATION**:

3.1.1 Provide positive lighting ground for each flagpole installation.

3.1.2. Paint portions of flagpole below grade with a heavy coat of bituminous paint.

3.2 **INSTALLATION:**

3.2.1. Excavation: Refer to Section 02200.

3.2.2. Concrete: 3,000 psi, place in accordance with Section 03300.

END OF SECTION 10350

SECTION 10431 – SIGNS

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1. This Section includes the following:

1.2.1.1 Interior ADA signage

1.2.1.2. Dimensional characters (letters and numbers) for exterior use.

1.2.1.3. Building plaque/plate.

1.2.2. Related Sections include the following:

1.3 **SUBMITTALS:**

1.3.1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.

1.3.2. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.

1.4 **QUALITY ASSURANCE:**

1.4.1. Installer Qualifications: An employer of workers trained and approved by signage manufacturer.

1.4.2. Source Limitations: Obtain each sign type through one source from a single manufacturer.

1.5 **PROJECT CONDITIONS:**

1.5.1. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

1.6 **COORDINATION:**

1.6.1. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.

1.6.1.1. For signs supported by or anchored to permanent construction, furnish templates for installation of anchorage devices.

PART 2 – PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

2.2 **BUILDING (INTERIOR ADA) SIGNAGE:**

2.2.1 Manufacturer:

2.2.1.1 ASI Sign Systems, Inc.

2.2.1.2 Model: SignEtch I.

2.3 **DIMENSIONAL CHARACTERS:**

2.3.1. Manufacturers:

2.3.1.1. ASI Sign Systems, Inc.

2.3.1.2. Charleston Industries, Inc.

2.3.1.3. Metal Arts; Div. of L&H Mfg.

2.3.1.4. Southwell Co. (The).

2.3.2. Aluminum Castings: Provide aluminum castings of alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.

2.4 **BUILDING PLAQUE/PLATE:**

2.4.1. Manufacturer: A.R.K. Ramos

2.4.2. Model: Bronze with standard #501 border, leatherette background, raised letters and border with satin finish, model #G-04.

2.4.3. Size: 18” x 24”.

2.5 **ACCESSORIES:**

2.5.1. Mounting Methods: Use concealed fasteners fabricated from materials that are not corrosive to sign material and mounting surface.

2.5.2. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.6 **FINISHES, GENERAL:**

2.6.1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.6.2. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

2.6.3. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.7 **ALUMINUM FINISHES:**

2.7.1. Color Anodic Finish: Manufacturer's standard integrally colored or electrolytically deposited color coating, 0.018 mm or thicker, in dark bronze with a polished (buffed) mechanical finish.

PART 3 – EXECUTION

3.1. **EXAMINATION:**

3.1.1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

3.1.2. Verify that items, including anchor inserts, provided under other sections of Work are sized and located to accommodate signs.

3.1.3. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.

3.1.4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

3.2.1. General: Locate exterior sign, dimensional characters, and building plaque along with accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.

3.2.1.1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.

3.2.2. Dimensional Characters: Mount characters using standard fastening methods recommended in writing by manufacturer for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.

3.2.2.1. Projected Mounting: Mount characters at projection distance from wall surface indicated.

3.3 **LEANING AND PROTECTION:**

3.3.1. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 10431

SECTION 10505 – METAL LOCKERS

PART 1 – GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.1 Metal lockers.

1.3 **DESCRIPTION:**

1.3.1. Work included:

1.3.1.1. Double tier steel box lockers.

1.4 **REFERENCE STANDARDS**:

1.4.1. American Society for Testing and Materials (ASTM) Publications:

1.4.1.1. Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip process (A 653-00)

1.4.2. Americans with Disabilities Act (ADA), Department of Justice, Office of the Attorney General.

1.4.2.1. Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities (28 CFR Part 36)

1.5 **SYSTEM DESCRIPTION:**

1.5.1. Design Requirements:

1.5.1.1. Comply with requirements of Americans with Disabilities Act.

1.5.1.1.1. Accessible lockers shall have recessed handles

1.5.1.1.2. Doors at accessible lockers shall be identified with accessibility pictogram on exterior face.

1.6 **SUBMITTALS:**

1.6.1 Product Data: Manufacturer's complete product information, specifications, color chart, and installation instructions.

1.6.2 Shop Drawings: Showing dimensions affecting installation. Include method of installation, fillers, trim, base, accessories, and locker numbering sequence.

1.7 **DELIVERY, STORAGE AND HANDLING:**

1.7.1. Do not deliver lockers until spaces to receive them are ready for installation and all painting is complete.

1.7.2. Deliver in manufacturer's original containers. Protect from damage during delivery, handling, and installation.

PART 2 - PRODUCTS

2.1 **ACCEPTABLE MANUFACTURERS**:

2.1.1. Lyon Metal Products, Inc.

2.1.2. Penco Products, Inc.

2.1.3. Republic Storage Systems, Inc.

2.1.4 List Industries, Inc.

2.2 **MATERIALS**:

2.2.1 Sheet steel: ASTM A 653, mild, cold rolled, leveled steel.

2.3 **ACCESSORIES:**

2.3.1. Number Plates: Three digits, manufacturer's standard polished aluminum finish. Attach in sequence as approved.

2.4 **FABRICATION:**

2.4.1. Double tier box lockers, overall size(s) as indicated on Drawings.

2.4.2. General:

2.4.2.1. Lockers shall be square, rigid, and without warp.

2.4.2.2. Doors: Flanged at all edges, constructed to prevent springing when opening and closing.

2.4.2.3. Fabricate doors to swing full 180 degrees.

2.4.2.4. Hinges: Heavy duty, minimum 0.074-inch thick steel, full-loop, 5-knuckle, tight pin. Weld to frame and secure to door with two (2) factory-installed fasteners which are concealed when door is in closed position.

2.4.3. Welded Construction: Factory assembled and welded into single structures, with common flat top and back.

2.4.3.1. Side, door frame, top, and bottom: Minimum 16 gage steel with flanged edges.

2.4.3.2. Back: Single-piece, minimum 18 gage steel.

2.4.3.3. Door:

2.4.3.3.1. One-piece, 16 gage sheet steel.

2.4.3.3.2. Sound-dampening panels welded to interior face. Do not use with louvers.

2.4.3.3.3. For use with pad lock.

2.4.3.4. Door ventilation: Manufacturer’s standard top and bottom louvers.

2.4.3.5. Two (2) hinges.

2.4.3.6. Door handle and latching: Recessed in the door with sound-deadening molded finger lift control, tamper-resistant, brushed stainless steel, securely attached to door. Pocket of sufficient depth to prevent a combination lock from protruding beyond the face of the door. Provide a lock hole cover plate for use with pad locks.

2.4.3.7 Base: Matching locker construction and finish.

2.4.3.8 Top/Sloped: matching locker construction and finish.

PART 3 – EXECUTION

3.1 **EXAMINATION AND PREPARATION:**

3.1.1. Field verify dimensions where lockers are to be installed prior to fabrication to ensure number of lockers indicated will fit in space provided. Notify Architect immediately of discrepancies noted.

3.2 **INSTALLATION:**

3.2.1. Install lockers in locations indicated plumb, level, flush, and in proper numbering sequence according to approved shop drawings.

3.2.2. Anchor lockers to base and wall at minimum 48 inches on center. Apply through back-up reinforcing plates where necessary to avoid metal distortion. Conceal fasteners where possible.

3.2.3. Install trim and metal filler panels where indicated. Use concealed fasteners to provide flush, hairline joints at joining surfaces.

3.3 **ADJUST AND CLEAN:**

3.3.1. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.3.2. Touch-up marred finishes to match factory paint. Replace units which cannot be restored to factory-finished appearances. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10505

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes the following:

1.2.1.1 Fire extinguishers.

1.2.1.2 Fire extinguisher cabinets.

1.3. **SUBMITTALS:**

1.3.1 General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product data for cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

1.3.3 Samples for initial selection purposes in the form of manufacturer's color charts consisting of actual units or sections of units showing full range of colors, textures, and patterns available for each type of cabinet finish indicated or exposed to view.

1.3.4 Samples for verification purposes in full-size units of each type of cabinet finish indicated, and in sets for each color, texture, and pattern specified, showing the full range of variations.

1.4. **QUALITY ASSURANCE:**

1.4.1 Single-Source Responsibility: Obtain extinguishers and cabinets from one source from a single manufacturer.

1.4.2 Coordination: Verify that cabinets are sized to accommodate type and capacity of extinguishers indicated and provided by Owner under separate Contract.

1.4.3 UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguisher.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

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

J.L. Industries.
Larsen's Manufacturing Co.
Modern Metal Products by Muckle.
Potter-Roemer, Inc.
Samson Metal Products, Inc.

2.2. **FIRE EXTINGUISHERS:**

2.2.1 General: Provide fire extinguishers for each cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, that comply with authorities having jurisdiction.

2.2.2 Multipurpose Dry Chemical Type: UL-rated 2-A:10:B:C, 5- lb nominal capacity, in enameled steel container.

2.2.3 Wet Chemical Type: UL-rated 2-A:K, 6 liter capacity, in enameled steel container.

2.3. **CABINETS:**

2.3.1 Construction: Manufacturer's standard box, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

2.3.2 Cabinet Type: Suitable for containing the following:

2.3.2.1 Fire extinguisher.

2.3.3 Cabinet Mounting: Suitable for the following mounting conditions:

2.3.3.1 Semi- Recessed: Cabinet box (tub) semi recessed in walls of sufficient depth to suit style of trim indicated. Provide fire-rated cabinets located in all rated wall assemblies.

2.3.4 Trim Style: Fabricate trim in one piece with corners mitered, welded, and ground smooth.

2.3.4.1 Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

2.3.4.1.1 Rolled-edge trim with 2-1/2-inch backbend depth.

2.3.4.1.2 Trim Metal: Enameled steel.

2.3.5 Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.

2.3.5.1 Enameled Steel: Manufacturer's standard finish, hollow steel door construction with tubular stiles and rails.

2.3.5.2 Door Glazing: Fully tempered float glass complying with ASTM C 1048, Condition A, Type I, Quality q3, Kind FT, Class as follows:

2.3.5.2.1 Class 2 (tinted, heat-absorbing and light-reducing), bronze tint.

2.3.6 Door Style: Horizontal Duo Panel

2.3.6.1 Duo Panel: Float glass, 1/8 inch thick.

2.3.7 Door Hardware: Provide manufacturer's standard door- operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 deg.

2.4. **FINISHES FOR CABINETS, GENERAL:**

2.4.1 Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

2.4.2 Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.

2.5. **STEEL CABINET FINISHES:**

2.5.1 Surface Preparation: Solvent-clean surfaces complying with SSPS-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5 (white metal blast cleaning) or SSPC-SP 8 (pickling).

2.5.2 Factory-Priming for Field-Painted Finish: Apply shop primer specified below immediately following surface preparation and pretreatment.

2.5.2.1 Shop Primer: Manufacturer's or fabricator's standard fast-curing, lead-free, universal primer, selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

2.5.3 Baked-Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard two-coat baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's instructions for applying and baking to achieve a minimum dry film thickness of 2.0 mils.

2.5.3.1 Color and Gloss: Manufacturer's standard color (to be selected) and gloss designations. Paint the following:

2.5.3.1.1 Interior and exterior of cabinet.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine rough-in for hose vales, hose racks, and cabinets to verify locations of piping connections prior to cabinet installation.

3.1.2 Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.

3.1.3 Do not proceed until unsatisfactory conditions have been corrected.

3.2. **INSTALLATION:**

3.2.1 Follow manufacturer's printed instructions for installation.

3.2.2 Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.

3.2.2.1 Prepare recesses in walls for cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

3.2.2.2 Fasten mounting brackets and cabinets to structure, square and plumb.

END OF SECTION 10522

SECTION 11452 - APPLIANCES

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS**:

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

1.2. **SUMMARY**:

1.2.1 This Section includes the following types of residential appliances:

1.2.1.1 Refrigerators.

1.2.1.2 Microwave Ovens.

1.2.1.3 Ice Makers.

1.2.2 Related Sections: The following sections contain requirements that relate to this Section:

1.2.2.1 Division 22 Section “Plumbing Fixtures” for Kitchen sinks.

1.2.2.2 Division 22 Section “Plumbing Fixtures” for appliances connections.

1.2.2.3 Division 26 Section “Electrical” for electrical services and connections for appliances.

1.3 **SUBMITTALS**:

1.3.1 General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product data for each appliance type required indicating compliance with requirements, including installation instructions. Provide complete operating and maintenance instructions for each appliance.

1.4 **QUALITY ASSURANCE**:

1.4.1 Energy Ratings: Provide appliances that carry labels indicating energy cost analysis (estimated annual operating costs) and efficiency information as required by Federal Trade Commission.

1.4.2 UL and NEMA Compliance: Provide electrical components required as part of residential appliances that are listed and labeled by UL and comply with applicable NEMA standards.

1.4.3 AHAM Standards: Provide appliances that conform to the following standards of the Association of Home Appliance Manufacturers:

1.4.3.1 Refrigerators and Freezers: Total volume and shelf area ratings certified according to ANSI/AHAM HRF-1.

1.4.4 Single-Source Responsibility: Obtain appliances from a single supplier.

1.4.4.1 Provide products from the same manufacturer for each type of appliance required.

1.4. **DELIVERY AND STORAGE**:

1.5.1 Deliver appliances to the Project site in the manufacturer's undamaged protective packaging.

1.5.2 Delay delivery of appliances until utility rough-in is complete and construction in the spaces to receive appliances is substantially complete and ready for installation.

1.5. **WARRANTIES**:

1.6.1 Warranty: Submit written warranties executed by the manufacturer of each appliance specified agreeing to repair or replace units or components that fail in materials or workmanship within the specified warranty period.

1.6.1.1 Microwave Oven: 5-year limited warranty on defects in the magnetron tube.

1.6.1.2 Refrigerator: 5-year warranty on the sealed refrigeration system.

1.6.2 Warranties specified above shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**:

2.1.1 Manufacturers: Subject to compliance with requirements, provide appliances manufactured by the following:

2.1.1.1 General Electric Company.

2.1.1.2 Summit Appliance.

PART 3 - EXECUTION

3.1 **INSTALLATION**:

3.1.1 General: Comply with manufacturer's instructions and recommendations.

3.1.2 Built-In Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

3.1.3 Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

3.1.4 Utilities: Refer to Divisions 15 and 16 for plumbing and electrical requirements.

3.2 **ADJUST AND CLEAN**:

3.2.1 Testing: Test each item of residential equipment to verify proper operation. Make necessary adjustments.

3.2.2 Accessories: Verify that accessory items required have been furnished and installed.

3.2.3 Cleaning: Remove packing material from residential equipment items and leave units in clean condition, ready for operation.

3.3 **SCHEDULE**:

3.3.1 General: Provide appliances as follows:

3.3.2 **TRANSIT/OPERATIONS WING DRIVER/LOUNGE AREA #109:**

3.3.2.1 **Countertop Microwave**: GE Model No. JES1657SMSS

3.3.2.2 **Refrigerator**: GE Model No. GIE21GSHSS

3.3.2.3 **Undercounter Ice Maker**: Summit Commercial Model No. BIM44GADA

3.3.3 **TRANSIT/OPERATIONS WING MILITARY HOSPITALITY ROOM #106:**

3.3.3.1 **Undercounter Refrigerator**: Summit Commercial Model No. SCR1841BADA

3.3.3.2 **Undercounter Ice Maker**: Summit Commercial Model No. BIM44GADA

3.3.4 **TRANSPORTATION/ADMINISTRATION WING PREP AREA #116A:**

3.3.4.1 **Countertop Microwave**: GE Model No. JES1657SMSS

3.3.4.2 **Refrigerator**: GE Model No. GIE21GSHSS

3.3.4.3 **Undercounter Ice Maker**: Summit Commercial Model No. BIM44GADA

END OF SECTION 11542

SECTION 12484 - FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS:**

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

1.2 **SUMMARY:**

1.2.1.1. This Section includes the following:

1.2.1.1 Entry Vestibule: Recessed roll-up type aluminum-tread rail floor mats with aluminum hinges at Transit/Operations Wing in Vestibules #100A/#100B, #108 and at Transportation/Administration Wing #101, #113A.

1.2.2. Related Sections include the following:

1.2.2.1. Division 3 Section "Cast-in-Place Concrete" for concrete work, including forming, placing, and finishing concrete floor slabs, and for concrete materials for grouting and filling around and under recessed mats and frames.

1.3 **SUBMITTALS:**

1.3.1. Product Data: Include manufacturer's specifications and installation instructions, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of floor mat and frame specified.

1.3.2. Shop Drawings: For floor mats and frames. Show assembly, joint locations, installation details, layout, plans, elevations, sections, details of patterns or designs, accessories, anchors, and attachments to other Work.

1.3.2.1. Coordinate Shop Drawings showing oversized recess for deferred installation of frames with concrete work.

1.3.3. Maintenance Data: For cleaning and maintaining floor mats to include in maintenance manuals.

1.4 **QUALITY ASSURANCE:**

1.4.1. Source Limitations: Obtain floor mats and frames through one source from a single manufacturer.

1.4.2. Accessibility Requirements: In addition to requirements of authorities having jurisdiction, provide installed floor mats that comply with Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.5 **PROJECT CONDITIONS:**

1.5.1. Field Measurements: Verify blocked-out openings in floors by field measurements before fabrication and indicate measurements on Shop Drawings.

1.5.1.1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating floor mats and frames without field measurements. Coordinate floor construction to ensure that actual opening dimensions correspond to established dimensions.

1.6 **COORDINATION:**

1.6.1. Coordinate size and location of oversized recesses in concrete work to receive floor mats and frames. Defer frame installations until building enclosure is completed and related interior finish work is in progress. Concrete, reinforcement, and formwork requirements are specified in Division 3.

1.6.2. Coordinate integral installation of recessed frames and anchors with placing of concrete slab so frames are positioned accurately.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS:**

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.1.1.1. Roll-up Aluminum Rail Hinged Mats:

a. Balco, Inc.
b. Construction Specialties, Inc.
c. J. L. Industries, Inc.
d. Pawling Corporation.

2.1.1.2. Size: 6’-0” wide x 4’-0” deep.

2.2 **METAL FRAME MATERIALS:**

2.2.1. Extruded Aluminum: ASTM B 221, alloy 6061-T6 or alloy 6063-T5, T6, or T52 as standard with manufacturer.

2.3 **CONCRETE FILL AND GROUT MATERIALS:**

2.3.1. Provide concrete materials complying with Division 3 for grout and fill around and under recessed mats and frames that produce concrete equivalent in strength to cast-in-place concrete slabs. For concrete fill, adjust aggregate size to not exceed one-third fill thickness.

2.4 **FLOOR MATS:**

2.4.1. General: Provide colors, patterns, and profiles of materials, including metals and metal finishes indicated or specified. If not indicated, provide colors, patterns, and profiles selected by Architect from manufacturer's standards.

2.4.2. Roll-up Aluminum Rail Hinged Mats: Medium-bronze-anodized finish, extruded-aluminum tread rails sitting on continuous vinyl cushions with 1-1/2-inch- wide by 3/8-inch- thick, tread rail modules. Provide aluminum hinges and aluminum oxide or silicon-carbide grit abrasive fill in epoxy matrix tread inserts.

2.4.2.1. Tapered Flexible Edges: Tapered flexible vinyl edge-frame members, not less than1-1/2 inches wide, attached to mat at all 4 edges, with welded mitered corners.

2.4.2.2. Tapered Rigid Frame: Tapered extruded-aluminum frame members, not less than 1-1/2 inches wide, with mitered corners and finish to match tread-slat extrusions.

2.5 **FABRICATION:**

2.5.1. General: Where possible, verify sizes by field measurement before shop fabrication.

2.5.2. Recessed Metal Mat Frames: Extruded aluminum, of size and style to fit floor mat type specified, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.

2.5.2.1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

2.5.3. With manufacturer's standard protective coating, coat surfaces of aluminum frames that will contact cementitious material.

2.6 **FINISHES, GENERAL:**

2.6.1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.6.2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.7 **ALUMINUM FINISHES:**

2.7.1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

2.7.2. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

2.7.2.1. Color: As selected by Architect from the full range of industry colors and color densities.

PART 3 - EXECUTION

3.1 **EXAMINATION:**

3.1.1. Examine substrates and floor conditions, and floor recesses for compliance with requirements for location, sizes, minimum recess depth, affecting installation of floor mats and frames.

3.1.1.1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

3.2.1. Install recessed mat frames to comply with manufacturer's written instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate top of mat surfaces with adjacent tile floor finish for flush installation.

3.2.1.1 Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.

3.2.1.2 Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.3 **PROTECTION:**

3.3.1. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

3.3.2 Defer installation of floor mats until Project is near Substantial Completion.

END OF SECTION 12484

SECTION 12511 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1. **RELATED DOCUMENTS:**

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

1.2. **SUMMARY:**

1.2.1 This Section includes venetian blinds to be provided at all windows.

1.2.2 Related Sections: The following Sections contain requirements that relate to this Section:

1.2.2.1 Division 8 Sections for windows with horizontal louver blinds mounted to head of window opening behind.

1.3. **SUBMITTALS:**

1.3.1 General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1.3.2 Product data for each type of horizontal louver blind specified. Include printed data on physical characteristics.

1.3.3 Shop drawings showing location and extent of blinds. Show installation details at and relationship to adjoining work. Include elevations indicating blind units. Indicate location of blind controls.

1.3.4 Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare samples from the same material to be used for the Work.

1.3.5 Schedule of horizontal louver blinds using same room designations indicated on Drawings. Blinds shall be installed in all exterior windows and doors as specifically indicated on drawings.

1.3.6 Maintenance data for horizontal louver blinds to include in the operation and maintenance manual specified in Division 1. Include the following:

1.3.6.1 Methods for maintaining horizontal louver blinds and finishes.

1.3.6.2 Precautions for cleaning materials and methods that could be detrimental to finishes and performance.

1.4. **QUALITY ASSURANCE:**

1.4.1 Fire-Test-Response Characteristics: Provide horizontal louver blinds identical to those tested for the following fire-test-response characteristics as determined by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.4.1.1 Test Method: NFPA 701.

1.4.3 Single-Source Responsibility: Obtain each type of horizontal louver blind from one source and by a single manufacturer.

1.4.4 Mockups: Prior to installing horizontal louver blinds, construct mockups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1.4.4.1 Locate mockups on-site in location and of size indicated or, if not indicated, as directed by Architect.

1.4.4.2 Notify Architect one week in advance of the dates and times when mockups will be constructed.

1.4.4.3 Demonstrate the proposed range of aesthetic effects and workmanship.

1.4.4.4 Obtain Architect's acceptance of mockups before start of final unit of Work.

1.4.4.5 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

1.4.4.6 Accepted mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.5. **PROJECT CONDITIONS:**

1.5.1 Field Measurements: Check actual horizontal louver blind dimensions by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule

with construction progress to avoid delaying the Work.

1.5.2 Space Enclosure and Environmental Limitations: Do not install horizontal louver blinds until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1. **MANUFACTURERS:**

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

2.1.1.1 Horizontal Louver Blinds:

Hunter Douglas, Inc.
Levolor Corp.
Springs Window Fashions Division, Inc.; (Bali-Graber).
Verosol USA, Inc.

2.1.2 Products: Subject to compliance with requirements, provide one of the products specified in each Product Data sheet at the end of this Section.

2.2. **HORIZONTAL LOUVER BLINDS:**

2.2.1 Louvers: Manufacturer's standard as follows:

2.2.1.1 Aluminum.

2.2.1.1.1 Nominal Louver Width: 1 inch (miniblinds).

2.2.2 Tilt Operation: Manual with wand.

2.2.2.1 Position of Tilt Control: Left side, unless otherwise indicated.

2.2.2.2 Tilt: Full.

2.2.2.2.1 Angle: 60 degrees from horizontal.

2.2.3 Cord-Lock Operation: Cord lock; locks pull cord to stop blind at any position in ascending or descending travel.

2.2.3.1 Position of Cord Lock: Right side, unless otherwise indicated.

2.2.4 Cord Equalizers: Self-aligning to maintain horizontal louver blind position.

2.2.5 Valance: Match color of louvers.

2.2.6 Mounting: Inside window frame.

2.2.7 Colors and Patterns: Where manufacturer's standard products are indicated, provide horizontal louvers complying with the following requirements:

2.2.7.1 Provide Architect's selections from manufacturer's full range of colors and patterns for horizontal louver blinds of type indicated.

2.3. **FABRICATION:**

2.3.1 Product Standard and Description: Comply with AWCMA Document 1029 for each horizontal louver blind unit consisting of louvers, rails, cord locks, tilting mechanisms, tapes, and installation hardware.

2.3.2 Lifting and Tilting Mechanisms: Noncorrosive, self- lubricating materials.

2.3.3 Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:

2.3.3.1 Blind Units Installed Behind Window Units: Width equal to 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch, less than jamb to jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch, plus or minus 1/8 inch, less than head to sill dimension of opening in which each blind is installed.

2.3.4 Installation Fasteners: Not less than 2 fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; support blind units under conditions of normal use.

PART 3 - EXECUTION

3.1. **EXAMINATION:**

3.1.1 Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of horizontal louver blinds. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. **INSTALLATION:**

3.2.1 Install blinds level, plumb, and located so exterior louver edges in any position are not closer than 1 inch to interior face of glass lites.

3.2.1.1 Jamb Mounted: Install headrail flush with face of opening jamb and head.

3.3. **ADJUSTING:**

3.3.1 Adjust components and accessories for proper operation.

3.4. **CLEANING:**

3.4.1 Clean blind surfaces, according to manufacturer's instructions, after installation.

3.4.2 Remove surplus materials, packaging, rubbish, and debris resulting from installation. Leave installation areas neat, clean, and ready for use.

3.5. **PROTECTION:**

3.5.1 Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensure that horizontal louver blinds are without damage or deterioration at the time of Substantial Completion.

3.6. **HORIZONTAL LOUVER BLIND SCHEDULE:**

3.6.1 General: Provide horizontal louver blinds to comply with requirements in this Section and with the following schedule of blinds:

3.6.1.1 Horizontal Louver Blind Designation: WB

3.6.1.1.1 Color: To be selected by Architect.

3.6.1.1.2 Blind Location: On all exterior windows.

3.6.1.1.3 Location of Tilt Control: Left side, unless otherwise indicated.

3.6.1.1.4 Location of Cord Lock: Right side, unless otherwise indicated.

3.6.1.1.5 Mounting: End.

END OF SECTION 12511

SECTI0N 15010 - GENERAL PROVISIONS (MECHANICAL CONTRACT)

PART 1 - GENERAL

1.1 **SCOPE OF WORK**:

1.1.1 The Contractor shall provide all materials, equipment and labor necessary to install and set into operation the heating, ventilation, and air conditioning system as shown on the Engineering plans and as contained herein.

1.1.1.1 Installation of new dampers, grilles, registers, or diffusers as shown on the drawings.

1.1.1.2 Installation of new packaged air conditioning unit, fan-powered boxes, and ductwork systems. Units will be DX cooling with gas heat.

1.1.1.3 Installation of roof caps and ventilators for exhaust and outside air intakes.

1.1.1.4 Insulation of ductwork in the designated locations.

1.1.1.5 Installation of control thermostats and accessories.

1.1.1.6 Installation of PVC gas flue venting systems.

1.1.1.7 Installation of new exhaust fans and ductwork systems.

1.1.1.8 All other items required for a complete operating heating, ventilating, and air conditioning system whether specifically indicated or prescribed.

1.1.2 Related Work Included Elsewhere:
Division 16: Electrical.

1.1.3 Architectural plans shall be referred to for necessary building dimensions. HVAC plans shall not be scaled to obtain dimensions or equipment locations; however, duct layout and register locations are shown in essentially correct locations.

1.2 **CODES AND STANDARDS**: All work shall be in accordance with the latest revision of applicable local, state, and federal regulations, codes, or specifications. Any conflict between the plans or the specifications and these codes and standards shall be immediately brought to the Architect/Engineer's attention for resolution.

1.2.1 The following is a list of agencies who set standards which have direct application under this Contract:

ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers - 1993 Fundamentals, 1992 HVAC Systems and equipment.

NFPA - National Fire Protection Association NFPA 90A and 96 Standards.

UL - Underwriters Laboratories, UL 181, UL 555S and UL555 - 1979 Standards.

NEMA - National Electrical Manufacturers Association.

ASME - American Society of Mechanical Engineers.

ARI - American Refrigeration Institute.

SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.

AMCA - Air Movement and Control Association, Inc.

1.2.2 The following is a list of agencies who set standards which may or may not have direct application under this contract:

ASTM - American Society for Testing Materials.

NBFU - National Board of Fire Underwriters.

ANSI - American National Standards Institute.

ASA - American Standards Association.

OSHA - Occupational Safety and Health Act.

NBS - National Bureau of Standards.

1.2.3 Where the previously mentioned agencies set forth standards which apply under this contract they shall be considered minimal.

1.3 **QUALITY ASSURANCE**:

1.3.1 See the General and Supplementary General Conditions and Division 1.

1.3.2 All work shall be in accordance with local, state and federal regulations. Minimum requirements shall be the Standard Building Mechanical with North Carolina 1997 revisions Code.

1.3.3 The Contractor shall be responsible for obtaining all permits and shall notify inspection departments as work progresses.

1.3.4 Wherever the words "Approved", "Approval" or "Approved Equal" appear, it is intended that items other than the model numbers specified shall be subject to the approval of the Owner and Architect/Engineer.

1.3.5 All material and equipment that the Contractor proposes to substitute in lieu of those specified in the specifications shall be submitted to the Owner and Architect/Engineer ten (10) days prior to the bid date for evaluation.

1.3.5.1 The submittal shall include a full description of the material or equipment and all pertinent engineering data required to substantiate the equality of the proposed item to that specified. Items that are submitted for approval after this date will not be accepted.

1.3.6 "Provide" as used herein shall mean that the Contractor responsible shall furnish and install said item or equipment.

1.3.7 "Furnish" as used herein used shall mean that the Contractor responsible shall acquire and make available said item or equipment and that installation shall be by others.

1.3.8 "Install" as used herein shall mean that the Contractor responsible shall make installation of items/equipment furnished by others.

1.3.9 **SPECIFICATION INDENTIFICATION**:

1.3.9.1 Where items are specified by catalog number, type, or manufacturer, it is for the purpose of establishing quality, general appearance, and function desired. Items by other manufacturers of equal quality and similar design may be submitted for consideration for use on the job. The Owner and Architect/Engineer's evaluation of the proposed substitution shall be final. Wherever three or more manufacturer's types or brands are listed herein, the contractor shall provide one of the items specified. **Items shown as a single source shall not be substituted.**

1.3.9.2 Where items are specified and listed or indicated on the plans which are ambiguous as to which has precedence, it shall be the responsibility of this contractor to contact the Architect or Engineer for a clarification before proceeding with pricing. Failure to clarify this before final bidding, will make the Architect or Engineer's decision final when shop drawings are submitted for approval.

1.4 **SUBMITTALS**:

1.4.1 See General and Supplementary General Conditions and Division 1.

1.4.2 Within ten (10) days after notification of the award of the Contract written notice to begin work, the Contractor shall submit to the Architect/Engineer for approval a detailed list of equipment and material which he proposes to use. Items requiring submittal data for approval will be noted at this time. Six (6) sets of submittal data shall be provided for approval.

1.4.3 Each submittal shall bear the approval of the Contractor indicating that he has reviewed the data and found it to meet the requirements of the specifications as well as space limitations and other project conditions.

1.4.4 Submittals shall be clearly identified showing project name, manufacturer's catalog number and all necessary performance and fabrication data.

1.4.5 The Contractor shall submit to the Engineer a set of accurately marked-up plans indicating all changes encountered during the construction. Final payment will be contingent on receipt of these "Record Drawings."

1.4.6 The Contractor shall furnish four (4) bound sets of maintenance and operating instructions, parts lists, electrical circuit wiring diagrams, all submittal data and sufficient manufacturer's literature to operate and maintain all equipment.

1.4.7 The Contractor shall submit to the Owner all certificates required for operating the system in compliance with local, state and federal regulations.

1.5 **SUBSTITUTIONS**:

1.5.1 Where the substitution of other than a specified product has been made, and subsequently reviewed by the Architect/Engineer, the Contractor proposing the substituted product shall also include in his bid all costs for other Architectural, required of the proper installation and operation of the substituted product. These changes shall be documented in the submittal of the substituted product.

1.6 **PRODUCT DELIVERY, STORAGE AND HANDLING**:

1.6.1 All material and equipment shall be delivered and unloaded by the Contractor within the project site as noted herein or as directed by the Owner.

1.6.2 The Contractor shall protect all material and equipment from breakage, theft or weather damage. No material or equipment shall be stored on the ground.

1.6.3 The material and equipment shall remain the property of the Contractor until the project has been completed and turned over to the Owner.

1.7 **WORK CONDITIONS AND COORDINATION**:

1.7.1 Pipe, conduit and duct chases required of installation of work shall be provided by the General Contractor unless otherwise noted. This Contractor shall be responsible for coordinating the location of all required chases.

1.7.2 All work shall be coordinated with other trades. Cutting of new work and subsequent patching shall be at the Contractor's expense at no extra cost to the Owner.

1.7.3 The Contractor will be responsible for coordinating the installation of all major equipment and accessories with the General Contractor. This includes the access for all equipment into the building structure.

1.7.4 The Contractor shall review the electrical plans to establish points of connection and the extent of electrical work to be provided in this Contract. All electrical work shall be performed by a licensed electrician.

1.7.5 This Contractor shall be responsible for the final electrical connections to all equipment installed as part of his Contract. Unless otherwise noted, this Contractor shall wire from his equipment to disconnect switches, junction boxes or panelboard circuit breakers as provided by the Electrical Contractor.

1.8 **GUARANTEE**:

1.8.1 See the General and Supplementary General Conditions.

1.8.2 Where extended warranties or guarantees are available from the manufacturer, the Contractor shall prepare the necessary Contract Documents to validate these warranties as required by the manufacturer and present them to the Owner.

1.8.3 The contractor shall include in his bid a full non- prorated warranty and guarantee for a five (5) year period on the compressor for the refrigeration equipment. This warranty does not include labor following the first year's Labor and Material Warranty.

1.9 **FEES AND PERMITS**:

1.9.1 The Contractor shall obtain and pay for all permits, fees, and inspections.

PART 2 - PRODUCT

2.1 **MATERIALS AND EQUIPMENT** shall be new, unless noted otherwise, of the highest grade and quality and free form defects or other imperfections. Materials and equipment found to be defective shall be removed and replaced at the Contractor's expense.

2.2 Name Plates shall be provided by the contractor for equipment, switches, panels, etc. The name plates shall be laminated phenolic plastic, black front and back with white core, white engraved letters (1/4" minimum) etched into the white core. Name plates to be fastened to devices with S.S. pan head sheet metal screws.

PART 3 - EXECUTION

3.1 **INSPECTION**:

3.1.1 This contractor shall examine the areas of completed work and shall ensure that no defects or errors are present which would result in the poor application or installation of subsequent work.

3.2 **INSTALLATION**:

3.2.1 All work shall be performed in a manner indicating proficiency in the trade.

3.2.2 All conduit, pipes, ducts, etc., shall be either parallel to building walls or plumb where installed in a vertical position and shall be concealed when located in architecturally finished areas.

3.2.3 Any cutting or patching required for installation of this Contractor's work shall be kept to a minimum. Written approval shall be required by the Architect/Engineer if cutting of primary structure is involved.

3.2.4 All patching shall be done in such a manner as to restore the areas or surfaces to match existing finishes.

3.2.5 Minor changes required by Owner, and any incidental changes required to meet structural conditions or to match trim shall be made by these contractors without extra cost to the Owner.

3.2.6 The mechanical contractor shall cooperate closely with the general contractor and all other contractors on the job in order that the job will progress smoothly to its completion. He shall lay out his pipe and ductwork in advance of pouring floors or installing walls, shall provide to the general contractor the location and size of any openings he may require, and shall furnish for the installation by the general contractor any sleeves, forms, inserts, or hangers required for his work. In the event of failure to do these things at the proper time, or improper location of the required items, the cutting and patching required to rectify the errors shall be borne by the contractor who installed the original material being cut but shall be paid by the contractor at fault, as determined by the Engineer, at no additional cost to the Owner.

3.2.7 All equipment shall be installed with sufficient access and clearance of maintenance, repairs, and replacement. In the event that it appears necessary to install equipment without proper access or clearance, the work shall be stopped until written permission is received from the Engineer to install the equipment. Pipes shall be installed in such a way as to allow maximum headroom where pipes are in occupied areas. Valves shall be located in such a position that they are easily accessible and so that the valve wheels can be easily turned to full open or full closed positions. Where valves, controls, etc. are installed in inaccessible areas, provide steel access panels, the panels shall be sufficiently large for the servicing of the equipment involved, or 12" x 12" minimum size.

3.3 **EXISTING UTILITY LINES**:

3.3.1 If any existing water, gas, sanitary sewer, storm drainage or other utilities are encountered which interferes with proper installation of new work, the contractor whose work is hindered by such utilities shall be responsible for the cost of repairing if existing utilities damaged, as well as the coordination with local utility departments to have work performed.

3.4 **CHASES, CUTTING AND PATCHING**:

3.4.1 In new construction, chases in walls for any work to be installed by the contractor will be provided by the general contractor provided full information as to the location and size of such chases and the necessary frames or openings is given to him by this subcontractor in such time as to cause no delay in the general contractor's work.

3.4.2 If this contractor should neglect to furnish the required information and by reason of his neglect chases and openings are not provided, the contractor shall bear the expense for cutting and required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.

3.4.3 The cutting of chases, openings, or holes in floors and ceilings shall be done in a manner as not to endanger the stability of the structure of any part thereof. The contractor shall not in any case cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs resulting form cutting shall be under the supervision of the Superintendent of the General Contractor.

3.5 **PERFORMANCE**:

3.5.1 The Contractor shall perform all excavation and backfill operations necessary for installation of his work.

3.6 **ERECTION**:

3.6.1 All support steel, angles, channels, pipes or structural steel stands and anchoring devices that may be required to rigidly support or anchor material and equipment shall be provided by this Contractor.

3.7 **FIELD QUALITY CONTROL**:

3.7.1 The Contractor shall conform to the requirements of Division 3 for concrete testing.

3.7.2 All testing required for compliance with the contract shall be as stated in subsequent sections.

3.7.3 Where intrusions are made into the existing domestic water system, that portion of the system or if required due to conditions, the entire domestic system serving the building shall be sterilized and flushed as described below.

3.7.3.1 All water piping shall be sterilized with chlorine, 50 milligrams per liter, and held for a 24-hour period after which the system shall be flushed and local authorities having jurisdiction shall be notified prior to the system being put into service.

3.7.3.2 During the flushing of the system, all flush valves shall be thoroughly flushed out to ensure the removal of sediment, pipe dope, etc., from water lines and flush valves, removing such working parts of the flush valves as may be deemed necessary.

3.8 **ADJUST AND CLEAN**:

3.8.1 All equipment and installed material shall be thoroughly cleaned and free of all dirt, oil, grit, grease, etc.

3.8.2 Factory painted equipment shall not be repainted unless damaged areas exist. These areas shall be touched up with material suitable for intended service. In no event shall name plates be painted.

3.8.3 At a scheduled meeting, the contractor shall instruct the Owner or the Owner's representative in the operation and maintenance of all equipment installed under this Contract.

3.8.4 Equipment with filter media shall be run for a period of two weeks after completion of work at which time a new filter media shall be installed with one change of filter media provided the Owner for future replacement. A total of three (3) sets shall be provided.

3.9 **INSPECTION CERTIFICATE**:

3.9.1 It shall be the responsibility of the Contractor to complete the installation of his work in accordance with the most recent requirements of the State where the construction is taking place and any applicable federal codes.

3.9.2 The Contractor shall notify the governing body having jurisdiction for inspection in writing, at least two weeks prior to the date of completion of all equipment requiring inspection.

3.9.3 A certificate of final inspection and approval shall be provided from the HVAC inspection department having jurisdiction. This shall be completed before the request for final inspection is called for.

END OF SECTION 15010

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1. GENERAL

1.1. **SUMMARY:**

1.1.1. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.

1.1.1.1. Equipment nameplate data requirements.

1.1.1.2. Installation requirements common to equipment specification Sections.

1.1.1.3. Cutting and patching.

1.1.1. Touchup painting and finishing.

1.2. **DEFINITIONS:**

1.2.1. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

1.2.2. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

1.2.3. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

1.2.4. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.2.5. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

1.2.6. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3. **QUALITY ASSURANCE:**

1.3.1. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.3.2. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.4. **SEQUENCING AND SCHEDULING:**

1.4.1. Coordinate mechanical equipment installation with other building components.

1.4.2. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

1.4.3. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.

1.4.4. Coordinate connection of electrical services.

1.4.5. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces.

PART 2. PRODUCTS

2.1. **IDENTIFYING DEVICES AND LABELS:**

2.1.1. Plastic Equipment Markers: Laminated-plastic, color-coded equipment markers. Conform to following color code:

2.1.1.1. Green: Cooling equipment and components.

2.1.1.2. Yellow: Heating equipment and components.

2.1.1.3. Yellow/Green: Combination cooling and heating equipment and components.

2.1.1.4. Blue: Equipment and components that do not meet any of the above criteria.

2.1.1.5. For hazardous equipment, use colors and designs recommended by ASME A13.1.

2.1.1.6. Nomenclature: Include following, matching terminology on schedules as closely as possible:

1) Name and plan number.
2) Equipment service.
3) Design capacity.
4) Other design parameters such as pressure drop, entering and leaving conditions, and rpm.

2.1.1.7. Size: Approximately 2-1/2 by 4 inches (65 by 100 mm) for control devices, dampers, and valves; and 4-1/2 by 6 inches (115 by 150 mm) for equipment.

2.1.2. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

2.1.2.1. Multiple Systems: Where multiple systems of same generic name are indicated, provide identification that indicates individual system number as well as service such as "Boiler No. 3," "Air Supply No. 1H," or "Standpipe F12."

PART 3. EXECUTION

3.0.1. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Contracting Officer's representative.

3.0.2. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

3.0.3. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

3.0.4. Equipment: Install engraved plastic laminate sign or equipment marker on or near each major item of mechanical equipment.

3.0.4.1. Lettering Size: Minimum 1/4-inch (6-mm) -high lettering for name of unit where viewing distance is less than 2 feet (0.6 m), 1/2-inch (13-mm) -high for distances up to 6 feet (1.8 m), and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.

3.0.4.2. Text of Signs: Provide text to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to name of identified unit.

3.1. **PAINTING AND FINISHING:**

3.1.1. Damage and Touch Up: Repair marred and damaged factory- painted finishes with materials and procedures to match original factory finish.

3.1.2. All exposed mechanical equipment and appurtenances to be painted a color as specified by the Contracting Officer's Representative.

3.3. **CUTTING AND PATCHING:**

3.3.1. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.

3.3.2. Repair cut surfaces to match adjacent surfaces.

END OF SECTION 15050

SECTION 15190 - PAINTING AND PIPE AND EQUIPMENT IDENTIFICATION

PART 1 - GENERAL

1.1 **SCOPE**:

1.1.1 All exposed pipe, pipe covering, hangers, and equipment installed by this contractor shall be painted unless it has a factory finish or is noted otherwise. Exposed chromeplated brass, stainless steel or plastic piping will not be painted.

PART 2 - PRODUCT

2.1 **PRODUCTS** shall be in accordance with the specification for painting in the general contract.

PART 3 - EXECUTION

3.1 **EQUIPMENT** shipped with a factory applied finish shall be cleaned of all construction spatter and touched up to repair any damage to the finish so that it is the same as new.

3.2 **PAINTING**: The Mechanical Contractor shall be responsible for painting of piping, equipment and accessories in the mechanical equipment rooms under this contract.

3.2.1 Galvanized duct and AHUs and galvanized or copper pipe will be cleaned of construction spatter but will not be painted.

3.2.2 Nongalvanized ferrous metal, other than insulated pipe, installed in areas that are not painted by the General Contractor (such as, outside building or above roofs) shall be painted two (2) coats of enamel.

3.2.3 Exposed nongalvanized ferrous metal hangers and miscellaneous metal used in connection with the Mechanical systems shall be painted with two (2) coats of enamel.

3.2.4 Exposed insulated and uninsulated piping installed by this Contractor shall be painted two (2) coats of oil based enamel paint. Pipe with plastic or aluminum jackets will not be painted.

3.2.5 Exposed copper pipe, brass valves or brass trim on iron body valves, or machinery or equipment that has a factory applied finish shall not be field painted unless otherwise specified.

3.2.6 Plastic pipe shall not be painted.

3.3 **DELIVERY OF PAINT**:

3.3.1 Paint shall be delivered to the project in unbroken containers.

3.3.2 Containers shall be labeled to indicate color, directions for use, manufacturer, and date of manufacturer.

3.3.3 Directions for use of the paint shall be carefully followed in the mixing and general application.

3.3.4 Paint shall be applied under dry and dust free conditions.

3.3.5 Sufficient time shall elapse between paint coats to permit satisfactory recoating. Once started, all painting shall be completed without delay.

3.4 **LABELS, IDENTIFICATION AND TAGS**:

3.4.1 All control components for equipment shall be identified using 3/4" high permanent engraved bakelite nameplates or 3/4" high anodized aluminum nameplates - white letters - black background, with minimum 1/4" high letters.

3.4.2 Nameplates shall be permanently attached to device or to wall or mounting panel above device. No stick-on type levels will be acceptable.

3.4.3 All equipment, including but not limited to fans, pumps, ventilating units and equipment cabinets shall be identified with yellow 1" high letters, using enamel paint and stencils.

3.4.4 Color:

3.4.4.1 Gray - Panelboards on which electric control components are mounted.

3.4.4.2 Flat Black - Surfaces visible through all grilles and registers and diffusers regardless who furnished the surface.

3.4.4.3 Color as directed by Architect - Equipment on roof, such as fans, make-up air unit, vents, stacks, supports.

3.4.4.4 Tan - Piping. All uninsulated ferrous pipes shall be painted with identifications as specified under identification.

END OF SECTION 15190

SECTI0N 15242 - VIBRATION ISOLATION

PART 1 - GENERAL

1.1 **VIBRATION ISOLATORS**:

1.1.1 All equipment having rotating or moving parts shall have vibration isolators to eliminate transmission of objectionable noise to other material or equipment.

1.1.1.1 Isolators shall be selected for the use intended and shall be approved by the Engineer.

PART 2 - PRODUCT

2.1 **FLEXIBLE CONNECTIONS** shall be provided between metal ductwork and motorized housings.

2.2 **FLEXIBLE FABRIC DUCT CONNECTORS** shall be 20-oz., fire retardant, UL labeled, Ventfab or approved equal.

2.3 **NEOPRENE** pads, springs, hangers, isolation pads, etc., where required, shown or indicated, shall be by Consolidated Kinetics Company, Vibration Mounting, Inc., Vibration Eliminator Company, or approved equal.

PART 3 - EXECUTION

3.1 **CONNECTIONS**:

3.1.1 Flexible connections shall be made according to the manufacturer's recommendations utilizing angles, bolts, clips or other fastenings necessary for securing the material to the duct and the equipment.

3.2 **EQUIPMENT**:

3.2.1 All vibration isolation equipment shall be coordinated with equipment specified and installed according to the manufacturer's recommendations.

END OF SECTION 15242

SECTION 15250 - MECHANICAL INSULATION

PART 1. GENERAL

1.1. **SUMMARY:**

1.1.1. This Section includes duct insulation.

1.2. **DEFINITIONS:**

1.2.1. Dual-Temperature Surfaces: Normal operating temperatures that vary from hot to cold.

1.2.2. Thermal resistivity is designated by an r-value that represents the reciprocal of thermal conductivity (k-value). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivity (r-value) is expressed by the temperature difference in degrees Fahrenheit between the two exposed faces required to cause 1 BTU per hour (1 Watt) to flow through 1 square foot at mean temperatures indicated.

1.2.3. Thermal Conductivity (k-value): Measure of heat flow through a material at a given temperature difference; conductivity is expressed in units of Btu x inch/h x sq. ft. x deg F.

1.2.4. Density: Is expressed in pcf (kg/cu. m).

1.3. **SUBMITTALS:**

1.3.1. Product data for each type of mechanical insulation identifying k-value, thickness, and accessories.

1.3.2. Material certificates, signed by the manufacturer, certifying that materials comply with specified requirements where laboratory test reports cannot be obtained.

1.4. **QUALITY ASSURANCE:**

1.4.1. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1.4.1.1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

1.4.1.2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.5. **SEQUENCING AND SCHEDULING:**

1.5.1. Schedule insulation application after testing of duct systems.

PART 2. PRODUCTS

2.1. **MANUFACTURERS:**

2.1.1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

2.1.1.1. Glass Fiber:

2.1.1.1.1. CertainTeed Corporation.

2.1.1.1.2. Knauf Fiberglass GmbH.

2.1.1.1.3. Manville.

2.1.1.1.4. Owens-Corning Fiberglas Corporation.

2.1.1.1.5. USG Interiors, Inc. - Thermafiber Division.

2.2. **GLASS FIBER:**

2.2.1. Material: Inorganic glass fibers, bonded with a thermosetting resin.

2.2.2. Jacket: All-purpose, factory-applied, laminated glass- fiber-reinforced, flame-retardant kraft paper and aluminum foil having self-sealing lap.

2.2.3. Board: ASTM C 612, Class 2, semi-rigid jacketed board.

2.2.3.1. Thermal Conductivity: 0.26 average maximum, at 75 deg F mean temperature.

2.2.3.2. Density: 12 Pcf average maximum.

2.2.4. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets.

2.2.5. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets.

2.2.5.1. Thermal Conductivity: 0.32 Btu x inch/h x sq. ft. x deg F average maximum, at 75 deg F mean temperature.

2.2.6. Adhesive: Produced under the UL Classification and Follow- up service.

2.2.6.1. Type: Non-flammable, solvent-based.

2.2.6.2. Service Temperature Range: Minus 20 to 180 deg F.

2.2.7. Vapor Barrier Coating: Waterproof coating recommended by insulation manufacturer for outside service.

2.3. **INSULATING CEMENTS:**

2.3.1. Mineral Fiber: ASTM C 195.

2.3.1.1. Thermal Conductivity: 1.0 Btu x inch/h x sq. ft. x deg F (0.14 W x m/sq. m x K) average maximum at 500 deg F mean temperature.

2.3.1.2. Compressive Strength: 10 psi at 5 percent deformation.

2.3.2. Mineral Fiber, Hydraulic-Setting Insulating and Finishing Cement: ASTM C 449.

2.3.2.1. Thermal Conductivity: 1.2 Btu x inch/h x sq. ft. x deg F average maximum at 400 deg F mean temperature.

2.3.2.2. Compressive Strength: 100 psi at 5 percent deformation.

2.4. **ADHESIVES:**

2.4.1. Lagging Adhesive: MIL-A-3316C, non-flammable adhesive in the following Classes and Grades:

2.4.1.1. Class 2, Grade A for bonding glass fiber insulation to metal surfaces.

2.5. **JACKETS:**

2.5.1. General: ASTM C 921, Type 1, except as otherwise indicated.

2.5.2. Foil and Paper Jacket: Laminated glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil.

2.5.2.1. Water Vapor Permeance: 0.02 perm maximum, when tested according to ASTM E 96.

2.5.2.2. Puncture Resistance: 50 beach units minimum, when tested according to ASTM D 781.

2.6. **ACCESSORIES AND ATTACHMENTS:**

2.6.1. Glass Cloth and Tape: Woven glass fiber fabrics, plain weave, pre-sized a minimum of 8 ounces per sq. yd.

2.6.1.1. Tape Width: 4 inches.

2.6.1.2. Cloth Standard: MIL-C-20079H, Type I.

2.6.1.3. Tape Standard: MIL-C-20079H, Type II.

2.6.2. Bands: ¾-inch wide, in one of the following materials compatible with jacket:

2.6.2.1. Stainless Steel: Type 304, 0.020 inch thick.

2.6.2.2. Galvanized Steel: 0.005 inch thick.

2.6.2.3. Aluminum: 0.007 inch thick.

2.6.2.4. Brass: 0.01 inch thick.

2.6.2.5. Nickel-Copper Alloy: 0.005 inch thick.

2.6.3. Anchor Pins: Capable of supporting 20 pounds each. Provide anchor pins and speed washers of sizes and diameters as recommended by the manufacturer for insulation type and thickness.

2.7. **SEALING COMPOUNDS:**

2.7.1. Vapor Barrier Compound: Water-based, fire-resistive composition.

2.7.1.1. Water Vapor Permeance: 0.08 perm maximum.

2.7.1.2. Temperature Range: Minus 20 to 180 deg F.

2.7.2. Weatherproof Sealant: Flexible-elastomer-based, vapor- barrier sealant designed to seal metal joints.

2.7.2.1. Water Vapor Permeance: 0.02 perm maximum.

2.7.2.2. Temperature Range: Minus 50 to 250 deg F.

2.7.2.3. Color: Aluminum.

PART 3. EXECUTION

3.1. **PREPARATION:**

3.1.1. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale, and dirt.

3.1.2. Mix insulating cements with clean potable water. Mix insulating cements contacting stainless-steel surfaces with demineralized water.

3.1.2.1. Follow cement manufacturer's printed instructions for mixing and portions.

3.2. **INSTALLATION, GENERAL:**

3.2.1. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each mechanical system.

3.2.2. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.

3.2.3. Install vapor barriers on insulated ducts, and equipment having surface operating temperatures below 60 deg F.

3.2.4. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.

3.2.5. Install insulation with smooth, straight, and even surfaces.

3.2.6. Seal joints and seams to maintain vapor barrier on insulation requiring a vapor barrier.

3.2.7. Seal penetrations for hangers, supports, anchors, and other projections in insulation requiring a vapor barrier.

3.2.8. Seal Ends: Except for flexible elastomeric insulation, taper ends at 45-degree angle and seal with lagging adhesive. Cut ends of flexible elastomeric cellular insulation square and seal with adhesive.

3.2.9. Apply adhesives and coatings at manufacturer's recommended coverage-per-gallon rate.

3.2.10. Keep insulation materials dry during application and finishing.

3.3. **DUCT INSULATION:**

3.3.1. Install block and board insulation as follows:

3.3.1.1. Adhesive and Bank Attachment: Secure block and board insulation tight and smooth with a least 50 percent coverage of adhesive. Install bands spaced 12 inches apart. Protect insulation under bands and at exterior corners with metal corner angles. Fill joints, seams, and chipped edges with vapor barrier compound.

3.3.1.2. Speed Washers Attachment: Secure insulation tight and smooth with speed washers and welded pins. Space anchor pins 18 inches apart each way and 3 inches from insulation joints. Apply vapor barrier coating compound to insulation in contact, open joints, breaks, punctures, and voids in insulation.

3.3.2. Blanket Insulation: Install tight and smooth. Secure to ducts having long sides or diameters as follows:

3.3.2.1. Smaller Than 24 Inches: Bonding adhesive applied in 6 inches wide transverse strips on 12 inches centers.

3.3.2.2. 24 Inches and Larger: Anchor pins spaced 12 inches apart each way. Apply bonding adhesive to prevent sagging of the insulation.

3.3.2.3. Overlap joints 3 inches.

3.3.2.4. Seal joints, breaks, and punctures with vapor barrier compound.

3.4. **JACKETS:**

3.4.1. Foil and Paper Jackets (FP): Install jackets drawn tight. Install lap or butt strips at joints with material same as jacket. Secure with adhesive. Install jackets with 1-1/2 inches laps at longitudinal joints and 3-inch wide butt strips at end joints.

3.4.1.1. Seal openings, punctures, and breaks in vapor barrier jackets and exposed insulation with vapor barrier compound.

3.4.2. Exterior Exposed Insulation: Install continuous aluminum jackets and seal all joints and seams with waterproof sealant.

3.4.3. Install metal jacket with 2 inches overlap at longitudinal and butt joints. Overlap longitudinal joints to shed water. Seal butt joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel draw bands 12 inches on center and at butt joints.

3.5. **APPLICATIONS:**

3.5.1. General: Materials and thicknesses are specified in schedules at the end of this Section.

3.5.2. Duct Systems: Unless otherwise indicated, insulate the following duct systems:

3.5.2.1. Interior concealed supply, return and outside air ductwork.

3.5.2.2. Interior exposed supply, return and outside air ductwork.

3.5.2.3. Exterior exposed supply and return ductwork.

3.5.2.4. Interior exposed and concealed supply fans, air handling unit casings and outside air plenums.

3.6. **DUCT SYSTEMS INSULATION SCHEDULE**

INTERIOR CONCEALED HVAC SUPPLY AND RETURN DUCTS AND PLENUMS

MATERIAL	FORM	INCHES	JACKET
GLASS FIBER	BLANKET	1-1/2	NONE

INTERIOR EXPOSED HVAC SUPPLY AND RETURN DUCTS AND PLENUMS

MATERIAL	FORM	INCHES	JACKET
GLASS FIBER RECT.	BOARD	1-1/2	NONE
GLASS FIBER ROUND	PIPE	1-1/2	NONE

EXTERIOR CONCEALED HVAC SUPPLY AND RETURN DUCTS AND PLENUMS

MATERIAL	FORM	INCHES	JACKET
GLASS FIBER RECT.	BOARD	2	NONE
GLASS FIBER ROUND	PIPE	2	NONE

END OF SECTION 15250

SECTION 15262 - PIPE INSULATION (REFRIGERANT AND CONDENSATE)

PART 1 - GENERAL

1.1 **INSULATION**:

1.1.1 Contractor shall insulate all refrigerant suction piping as specified below.

1.1.2 All insulation, linings, coverings and adhesives shall have a flame spread classification of 25 or less and a smoke developed rating of not more than 50, except for exposed outside piping.

PART 2 - PRODUCT

2.1 **SUCTION PIPING**:

2.1.1 Suction piping shall be insulated with closed cell insulation, 1/2" thick, Armstrong Armaflex 22 or by Rubertex. Insulation shall be finished with a fire retardant coating to attain proper smoke rating.

2.2 **CONDENSATE PIPING**:

2.2.1 Condensate piping shall be insulated as described in 2.1.1.

PART 3 - EXECUTION

3.1 **BENDS** in the insulation shall be made with mitered and glued joints. Where possible, insulation shall be applied without splitting lengthwise. Tape shall not be allowed to secure insulation.

3.2 **CLOSED CELL INSULATION** shall be installed in strict accordance with manufacturer's installation instructions.

3.3 **PIPE COVERING PROTECTION SADDLES**:

3.3.1 Pipe covering protection saddles shall be used at all supports for insulated piping. Metal shields shall be 10-gauge, half the circumference of the pipe and a minimum of 12-inches long.

3.4 **EXTERIOR EXPOSED PIPING SUPPORTS**: shall be painted with two (2) coats of oil base paint Rustoleum or other manufacturer approved by Owner and Architect/Engineer. Color shall be selected by the Owner.

3.5 **EXTERIOR EXPOSED PIPING INSULATION**: shall be covered with an aluminum jacket.

3.6 **REFRIGERANT SUCTION PIPING**: shall be insulated over the entire length from the condenser unit to the fan coil unit.

3.7. **CONDENSATE PIPING**: shall be insulated from the unit to the wall. Piping risers down to grade inside the wall will not be insulated.

END OF SECTION 15262

SECTION 15290 - DUCT INSULATION (LOW PRESSURE)

PART 1 - GENERAL

1.1 **INSULATION**:

1.1.1 All ductwork shall be insulated by the Contractor as outlined below or as indicated on the plans.

1.1.2 All insulation, linings, coverings, and adhesives shall have a flame spread classification of 25 or less and a smoke developed rating of not more than 50, except exposed exterior piping.

1.1.3 All duct insulation shall comply with the Standard Building Mechanical Code and NFPA.

1.1.4 All supply ductwork will be insulated for all systems with Type "A". All exposed return, make-up air ductwork in attic for all systems shall be completely insulated with Type "A".

PART 2 - PRODUCT

2.1 **TYPE A - ALL-SERVICE DUCT WRAP INSULATION:**

2.1.1 Material: Fiberglas duct wrap 1.5 lb/cu.ft. density factory laminated to a reinforced foil/kraft (FRK) vapor retarder facing.

2.1.2 Thickness: 1-1/2".
Make: Certainteed duct wrap Type IV or Owens Corning.

PART 3 - EXECUTION

3.1 **INSTALLATION**:

3.1.1 Type A: Duct wrap shall be installed according to manufacturer recommendations with 2" overlap seams and sealed with pressure sensitive tape matching the facing.

3.2 **DUCT DIMENSIONS**:

3.2.1 Duct dimensions shown on the drawings are Net Inside Dimensions.

3.3 **UNINSULATED DUCTWORK**:

3.3.1 Uninsulated exposed ductwork shall be cleaned to remove any dust, oil, etc. and then primed with one coat of paint in preparation for final painting by the General Contractor.

END OF SECTION 15290

SECTION 15400 - GENERAL PLUMBING

PART 1 - GENERAL

1.1 **SCOPE OF WORK**: Provide all plant, labor, materials, apparatus, services, and equipment required for the installation of a fully operating plumbing system as shown on the accompanying drawings and specified in this document.

1.2 **NOTICE TO BIDDERS**: Instructions to Bidders, General Conditions of the Contract, General Requirements, and Supplementary General Conditions bound in the front of this document are a part of the specifications for this work.

1.3 **FEES AND PERMITS**: The Contractor shall obtain all necessary permits and pay all necessary fees required to perform the work.

1.4 **THE DRAWINGS** accompanying this specification are generally diagrammatic and do not show all details required for the complete system. They should, however, be followed as closely as possible in the general arrangement and location of equipment. Check all dimensions at the building and investigate all structural and finish conditions. Arrange all work to meet these conditions and provide such offsets, brackets, and other necessary accessories as may be required. Refer to architectural drawings for exact locations of plumbing fixtures.

1.5 **ARCHITECTURAL AND STRUCTURAL DRAWINGS** shall take precedence over the plumbing drawings regarding building construction, dimensions and arrangement.

1.6 **IMMEDIATELY UPON DISCOVERY** of any discrepancy in the drawings or the specifications, or points of conflict therein, notify the Engineer who will clarify such discrepancy in writing prior to the progress of the work beyond the point concerned.

1.7 **DO NOT CONCEAL WORK OR MATERIALS** underground or in the building construction until it has been inspected and approved by the Engineer or Engineer Representative.

1.8 **APPLICABLE CODES, REGULATIONS AND SPECIFICATIONS**:

1.8.1 Standard Building Code and all local codes, latest issue.

1.8.2 North Carolina Boiler and Pressure Vessel Rules, latest issue.

1.8.3 National Fire Protection Association Codes and Standards, latest issue.

1.8.4 AGA, AMSI, ASME, ASTM, AWWA and other Standards as specifically referred to in these specifications.

1.8.5 Underwriters Laboratories Fire Resistance Directory, latest issue.

1.9 **THE CONTRACTOR SHALL** provide a one year guarantee on the materials, equipment and workmanship against defects. All labor and materials required to repair or replace defective equipment, materials or workmanship shall be provided at no cost to the Owner. Guarantee period shall begin on the date of acceptance by the Owner and Engineer.

PART 2 - PRODUCTS

2.1 **WHERE THREE OR MORE MANUFACTURERS** are listed for an item of equipment without an "or other approved manufacturer" clause, the Contractor may, at his option, provide any one of those specified. Equipment by manufacturers other than those listed will not be considered.

2.2 **WHERE ONE OR TWO MANUFACTURERS** are listed for an item of equipment with an accompanying "or approved equivalent" clause, the Contractor may, at his option, provide the specified item or propose a substitute item of equivalent quality, size, appearance, quantity, capacity and performance in accordance with paragraph 2.3 of this section of the specifications. The Engineer shall determine whether a substitute item is equivalent to the product specified.

2.3 **SUBSTITUTIONS**:

2.3.1 The materials, products and equipment described in the Specifications establish a standard of required quality, size, appearance, quantity, capacity, and performance to be met by any proposed substitution.

2.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Owner and Architect/Engineer at least ten days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data (product sample(s), and any other information necessary for an evaluation. A statement setting forth any changes required in other materials, equipment or other work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The Owner and Architect/Engineer's decision of approval or disapproval of a proposed substitution shall be final.

2.3.3 If the Owner and Architect/Engineer approves any proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

2.3.4 No substitutions will be considered after award of contract unless specifically provided in the contract documents.

2.4 **ALL MATERIALS AND EQUIPMENT SPECIFIED OR SHOWN ON THE DRAWINGS** shall be new and free from defects. Each item of equipment shall bear the manufacturer's name or trademark.

2.5 **DIMENSIONS**: Before installing equipment, make field measurements to insure that all items of equipment furnished will fit into the space as shown on the drawings. Where equipment will not fit as shown on the drawings, provide a drawing to the Engineer for approval with a proposed revised arrangement before installing the equipment.

2.6 **FOLLOW MANUFACTURER'S DIRECTIONS** in the delivery, storage, protection, and installation of all equipment and materials. Notify the Engineer in writing of any conflict between the requirements of the contract documents and the manufacturer's directions. In addition, store all equipment in such a manner to protect it from the weather. Equipment which is to be permanently used indoors shall not be exposed to weather conditions unless adequately protected on the job site.

2.7 **SUBCONTRACTOR AND MATERIALS LIST**: Provide, within 10 days after award of contract, a complete list of proposed subcontractors and materials including manufacturers' names.

2.8 **SHOP DRAWINGS AND CATALOG DATA**: Approval of shop drawings for any material, apparatus, devices, and layouts shall not relieve the Contractor from the responsibility of furnishing same as required by the contract documents. If the shop drawings deviate from the requirements of the contract documents, advise the Engineer of the deviations in writing accompanying the shop drawings, including the reason for deviations. Any items found on the job either installed or not installed which do not meet the above criteria shall be replaced at the discretion of the Engineer by the Contractor. The Contractor shall review and stamp all shop drawing submittals before submitting them to the Engineer for approval. Any submittals not stamped and signed by the Contractor prior to submittal to the Engineer will be returned to the Contractor for his stamp and resubmittal. Keep a copy of the shop drawings on the job at all times. See this section for required shop drawing submittals.

PART 3 - EXECUTION

3.1 **SUPERVISION**: A thoroughly competent foreman shall be in charge of the construction work at all times.

3.2 **ALL WORK**: Execute in the best and most workmanlike manner. Use only skilled mechanics. Cover and protect all work and materials throughout the course of the work.

3.3 **LOCATION OF FIXTURES, EQUIPMENT AND APPURTENANCES**: Adjust to avoid interferences with other equipment. Field determine mounting heights of fixtures before rough-in is started. Determine mounting heights of fixtures outside the building after final grade is established. Coordinate with Engineer before installation of equipment is started.

3.4 **BUILDING AND FINISHES** shall be protected. The Contractor is responsible for all damages caused to the building by his work and shall be responsible for repairing all damage done.

3.5 **SUPPORTS**: Properly support all work and equipment installed under this contract plumb and parallel with lines of building. Study all general, structural, plumbing, mechanical, and electrical drawings, shop drawings, and catalog data to determine how equipment, accessories, piping, fixtures, and related items are to be supported, mounted, or suspended. Provide all bolts, inserts, pipe stands, brackets, structural supports, and accessories for proper support of equipment furnished under this contract.

3.6 **WHERE STEEL PIPE SLEEVES ARE REQUIRED** for floor or wall penetrations, the Contractor is responsible for furnishing such sleeves to the General Contractor prior to construction of the floor or wall, and shall direct the General Contractor regarding exact sleeve locations. The Contractor shall furnish the sleeves upon request of the General Contractor, and the General Contractor shall install the sleeves in the floor or wall construction.

3.7 **PROVIDE SUITABLE VIBRATION ISOLATION SYSTEMS** as indicated and/or required for all rotating, reciprocating, and vibrating equipment. Design all isolation for maximum absorption efficiency so that no transmission of vibration or structurally-borne noise shall occur. The selection of isolators for proper loading to obtain the desired efficiency shall be the responsibility of the manufacturer of the isolating units and shall be fully guaranteed by the manufacturer.

3.8 **ALL CUTTING, PATCHING, AND PAINTING** necessary for the work under this contract shall be the responsibility of this Contractor and paid for by same. Employ the General Contractor to actually perform all patching and painting work. No part of the building may be broken out, cut, burned out, or permanently removed without the approval of the Engineer.

3.9 **AFTER INSTALLATION** is completed and all adjustments made, provide to the Engineer for distribution three sets of Operations and Maintenance Manuals, for all equipment and systems furnished, bound in black hard-back three-ring covers. Include the following

3.9.1 Contractor's name, business address and mailing address, telephone numbers and emergency telephone numbers.

3.9.2 Wiring and control diagrams

3.9.3 Lubrication schedule

3.9.4 Maintenance instructions and parts lists

3.9.5 Routing operating instructions and data

3.9.6 Part numbers

3.9.7 Manufacturers' cuts

3.9.8 Serial numbers

3.9.9 Before final acceptance of the work, the Contractor shall instruct a designated representative of the Owner in the entire operation of this system. Include instruction in control of all equipment and motors, sequence of operation of all controls, and proper maintenance of all equipment. Notify the Engineer in writing upon completion of such instruction.

3.10 **RECORD DRAWINGS**: Provide one complete set of plumbing drawings as record drawings showing the work as actually installed. Use the drawings as work progress report sheets and make any notations, neat and legible, thereon daily as the work proceeds. The drawings shall be available for inspection at all times at the job site. Drawings shall include elevations of all buried work. Upon completion of the work, sign the record drawings, date, and submit to the Engineer.

3.11 **CLEAN-UP AND SHAPE-UP THE AFFECTED PREMISES** upon completion of the work under this contract or any part thereof as the work progresses.

3.12 **CHANGES TO ELECTRICAL WIRING AND OVERCURRENT PROTECTION SIZES**: Electrical wiring and overcurrent protection serving plumbing equipment have been sized according to the requirements of the specified manufacturer. If the Contractor elects to use an item of plumbing equipment with different wiring and overcurrent protection requirements, he shall arrange with the Electrical Contractor to have the wire and overcurrent protection sizes changed as required. This shall be done at no additional cost to the Owner.

3.13 **DELETED**:

3.14 **SHOP DRAWINGS REQUIRED**:

3.14.1 Interior Piping Systems

3.14.1.1 Domestic water pipe, fittings, and valves

3.14.1.2 Sanitary sewer pipe and fittings

3.14.2 Fixtures and Associated Equipment

3.14.2.1 Water closet

3.14.2.2 Lavatory

3.14.2.3 Sinks

3.14.2.4 Shower

3.14.2.5 Drinking fountain

3.14.2.6 Floor drains, cleanouts, hose bibbs and anti-freeze hydrants

3.14.2.7 Water heater(s) and associated equipment

3.14.2.8 Hangers and supports

3.14.2.9 Pipe and equipment insulation

3.14.2.10 Valves

3.14.2.11 Traps, cleanouts

3.14.2.12 Electrical equipment (starters, disconnects, controls, and housing).

3.14.2.13 Whirlpool

END OF SECTION 15400

SECTION 15402 - PLUMBING EXCAVATION AND BACKFILLING

PART 1 - GENERAL

1.1 **SCOPE OF WORK**: Provide all plant, labor, materials, accessories and equipment required to perform all excavation and backfilling as required for the installation of the work as shown on the accompanying drawings and specified in this document.

1.2 **WORK INCLUDED**:

1.2.1 Excavation

1.2.2 Backfill and compaction

PART 2 - EXECUTION

2.1 **ALL EXCAVATION AND BACKFILLING WORK** shall conform to the North Carolina Department of Labor Occupational Safety and Health Standards for the Construction Industry, latest issue.

2.2 **EXCAVATION AND BACKFILLING**: Perform all excavation required for the installation of this work of whatever substance encountered, to the depths indicated and required.

2.2.1 Excavated Materials: During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from trench banks to avoid overloading and to prevent cave-ins. Remove waste materials from site.

2.2.2 Sheeting and Shoring: Provide adequate support of trench sidewalls for protection of the work and personnel.

2.2.3 Classification of Excavation: The following materials shall be classed as earth excavation and shall be excavated without extra compensation: Clay, silt, sand, muck, gravel, hardpan, rock, loose shale, loose stones in masses, old building materials, and roots.

2.2.4 Rock Excavation:

2.2.4.1 Rock shall be defined as material consisting of large solid mass yielding a metallic ring when struck with a metal hammer and which will require blasting or cutting to remove. Written approval shall be obtained before blasting. Rock will be classified as earth excavation.

2.2.4.2 Hand rock excavation shall be defined as rock excavation by the use of hand cutting by air hammer or similar devices, with no explosives used. Hand excavation shall be executed where the use of explosive and/or machines for excavation is not practical or is disallowed.

2.2.4.3 Rock excavation by explosives and machinery shall be defined as rock excavation where use of explosives and machinery is permitted.

2.2.4.4 Rock shall be excavated to a minimum overdepth of four inches below the bottom of all trenches. Loose granular earth shall then be placed in the overdepths up to the level of the trench bottom and compacted to 90 percent of maximum density using modified proctor method.

2.2.4.5 Rock that has been excavated shall be removed from the site.

2.2.5 Trench Excavations:

2.2.5.1 General: Trenches shall be of sufficient width for the proper laying of the pipe, and the bank shall be as near vertical as practical. Except where necessary to excavate for joints, and for the proper sealing of pipe joints, the bottom of the trenches shall be graded accurately to provide uniform bearing and support on undisturbed soil for each section of the pipe at every point along its entire length.

2.2.5.2 Depressions for joints shall be formed after the trench bottom has been graded and, in order that the pipe shall rest upon the prepared bottom for as near its full length as practicable, shall be only of such dimensions required for proper making of the joints.

2.2.5.3 Wet or otherwise unstable soil incapable of supporting pipe properly in the trench bottom shall be removed, and the trench shall be backfilled to the proper grade with coarse sand, fine gravel, or other suitable material.

2.2.5.4 Trenches shall be excavated to a depth that will provide the minimum cover above the top of the pipe required by specifications or noted on the drawings, and which will avoid interference with other utilities.

2.2.6 Sanitary Building Drains and Sewers:

2.2.6.1 The width of the trench at and below the top of the pipe shall be such that the clear space between the pipe barrel and the trench wall shall not exceed eight inches on either side of the pipe.

2.2.6.2 The trench bottom shall be rounded such that at least the bottom quadrant of the pipe rests firmly upon undisturbed soil for as near the full length of the pipe as practicable. This portion of the work shall be performed manually only a few feet in advance of the pipe laying and shall be performed by personnel skilled in this type of excavation.

2.2.7 Existing Utilities: Extreme caution shall be exercised in advance to avoid damage to existing utility lines underground wherever work is to be installed under this work section.

2.2.7.1 Known: Existing utilities indicated on the drawings, or the locations of which are made known to the Contractor in advance, shall be protected from damage, and if damaged, shall be repaired by the Contractor at his expense.

2.2.7.2 Unknown: Any existing utility not indicated in the drawings, or the location of which is not known to the Contractor in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor, and the adjustment in payment will be made as determined by the Engineer.

2.2.7.3 Backfill shall be compacted to 95 percent of maximum density at optimum moisture content using the modified proctor method under buildings and paving and 90 percent in other areas. The Contractor shall inform the Owner and Engineer before any backfill work is done so that the Owner can arrange for a Testing Laboratory to test the backfill as it is placed. Any backfill which fails shall be removed and replaced by the Contractor at no cost to the Owner. The Contractor shall reimburse the Owner for the cost of any additional tests required because of the failure of previous tests.

2.2.8 Dewatering:

2.2.8.1 The Contractor shall perform excavations in such a manner as to prevent surface water and subsurface or ground water from flowing into or accumulating in excavations. Remove water from area of excavation by whatever means necessary, including, but no limited to, the use of sheet piling and well point drilling.

2.2.8.2 The Contractor shall provide and operate pumps or other equipment necessary to drain and keep excavations free of water at all times.

2.3 **SAFETY MARKERS**: Safety markers or barriers shall be placed around all work areas and all such areas shall be lighted at night with flambeaux or other suitable lights.

2.4 **WARNING TAPES FOR UNDERGROUND PIPING EXTERIOR TO BUILDING**: For the purposes of early warning and identification of buried pipes during trenching or other excavation, continuous identification tapes shall be provided in the trench. Tape shall be detectable magnetic plastic tape or detectable aluminum foil plastic-backed tape manufactured for the purpose of early warning and identification of utilities buried below the tape. Tape shall be at least three inches in width. Color of tape shall be as standard with the manufacturer with respect to the type of utility buried below the tape. Tape shall have lettering at least one inch high with not less than the following identification on the tape: "BURIED SEWER LINE BELOW" (or "WATER" or "GAS" as applicable). Tape shall be installed in accordance with the printed recommendations of the tape manufacturer, as modified herein. Tapes shall be buried at a depth of 12 inches below the top surface of earth under pavement, as measured from the top of the subgrade.

END OF SECTION 15402

SECTION 15411 - SANITARY PIPING SYSTEM

PART 1 - GENERAL

1.1 **SCOPE OF WORK**: Provide all plant, labor, materials, accessories, and equipment required to install all drain, waste, and vent, roof and general drainage piping systems as shown on the accompanying drawings and specified in this document.

1.2 **GENERAL REQUIREMENTS**: The drawings do not show or indicate all offsets, fittings, or accessories which may be required, but those items shall be provided by the contractor.

1.3 **WORK INCLUDED**:

1.3.1 Drain, waste and vent piping and fillings

1.3.2 Pipe hangers and support

1.3.3 Drainage products and accessories

PART 2 - PRODUCTS

2.1 **DRAIN, WASTE AND VENT PIPING**:

2.1.1 Piping shall be polyvinyl chloride (PVC) schedule 40 plastic DWV piping plain ends, in accordance with ASTM D2665.

2.1.2 Fittings shall be polyvinyl chloride (PVC) schedule 40 made to ASTM D3311, socket type, DWV pattern. Solvent cement joints in accordance to ASTM D2665.

2.2 **INDIRECT WASTE PIPING**:

2.2.1 Piping shall be polyvinyl chloride (PVC) schedule 40 plastic DWV piping plain ends, in accordance with ASTM D2665.

2.2.2 Fittings: Wrought copper, ANSI B-16.22-1989.

2.3 **PIPE HANGERS**:

2.3.1 Hangers shall be as manufactured by Grinnell, Blaw- Knox, B-Line, or other manufacturer approved by Owner and Architect/Engineer. Hangers shall be sized to support piping filled with water with a safety factor of five (5) based on ultimate tensile strength sagging, and sized to permit insulation to pass through.

2.3.2 Hangers shall conform to the following schedule:

Cast Iron, Pipe and Fitting	Grinnell Fig. No.	Condition
1) Adjustable split swivel ring	104	Horizontal 2" to 3”
2) Adjustable clevis	260	Horizontal 2" to 8” bare
3) Adjustable clevis	300	Horizontal 2" to 8”, insulated
4) Riser clamp at floor	261	Vertical

2.4 **HANGER SUPPORTS**:

2.4.1 Hanger Rods: Plain, end-threaded, or all-thread steel rod.

2.4.2 Supports:

2.4.2.1 Steel plates, hanger rod and nuts for precast concrete decks.

2.4.2.2 Cast iron beam clamps or C-clamps for metal decks with bar joists or beams.

2.4.2.3 Concrete inserts for poured-in-place concrete deck.

2.5 **ESCUTCHEONS**: Heavy spun or stamped chromium plated steel, split hinged.

2.6 **FLASHING MATERIALS**:

2.6.1 Vent Flashing: 16 oz./sq.ft. sheet copper or 4.0 lb./sq.ft. sheet lead, shop fabricated into one-piece base flashing and separate counter (cap) flashing.

2.6.2 Seepage Pan and Area Flashing: 16 oz./sq.ft. sheet copper or 4.0 lb./sq.ft. sheet lead; field cut and fabricated.

2.7 **CLEANOUTS**:

2.7.1 Provide cleanouts of type indicated on drawings and in accordance with ANSI A 112.36.2M - 1983. Same size as pipe served but not larger than 4" diameter.

2.7.2 Provide cleanouts with flashing collars and clamps where installed in floors which are waterproof.

2.7.3 In Floors: Adjustable floor cleanout cast iron body with gas and watertight bronze threaded and round scoriated polished nickel bronze top adjustable to finish floor.

2.7.4 In Vertical Pipe in Unfinished Area: Cast iron, 90- degree y-branch or cast iron test tee with brass screw plug.

2.7.5 In walls of finished areas: Cast iron, 90-degree y- branch or cast iron test tee with brass screw plug with chromium plated brass or stainless steel cover plates.

2.7.6 In horizontal lines: Cast brass screw plug in fitting or in caulked cast iron ferrule.

2.7.7 Manufacturer: Submit to compliance with requirements, provide cleanouts of one of the following:

Zurn Industries
J. R. Smith Manufacturing Co.
Ancon Manufacturing Co.
Josam Manufacturing Co.

2.8 **FLOOR DRAINS**:

2.8.1 Provide floor drains of size and type as indicated on drawings and in accordance to ANSI A 112.21.1M-1980.

2.8.2 Mechanical Area Drains: All floor drains in mechanical areas shall have trap primers and deep seal trap with a 4" water seal. Trap primer connections shall be on either the floor drain body or on the deep seal trap.

2.8.3 Toilet Areas: All floor drains traps water seal shall be maintained by an hose bibb located in the same room with non-absorbent floor. Provide trap primer if hose bibb is not acceptable to local plumbing inspector.

2.8.4 All Mechanical and Kitchen Equipment: Shall have an indirect connection with air gap as required per North Carolina Plumbing Code. In mechanical areas subject to splashing of water, a bronze air gap fitting is to be provided.

2.8.5 Manufacturer: Submit to compliance with requirements, provide cleanouts of one of the following:

Zurn Industries
J. R. Smith Manufacturing Co.
Ancon Manufacturing Co.
Josam Manufacturing Co.

PART 3 - EXECUTION

3.1 **PIPING INSTALLATION**:

3.1.1 Drain and Waste Lines: Install grading down toward stacks or terminal point at a slope of 1/8" per foot minimum.

3.1.2 Directional Changes of Drain Piping: Make with long radius fittings using 45-degree wyes and half wyes Long sweep quarter bends may be used in soil and waste lines where the change in direction of flow is from the horizontal to the vertical.

3.1.3 Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, and anchorage. All piping shall be cut accurately for fabrication to measurements established at the construction site. Piping shall be full lengths to the greatest extent feasible. Pipe shall be worked into place without springing or forcing, properly clearing all windows, doors, and other openings and equipment. Cutting or other weakening of the building structure to facilitate installation will not be permitted. All pipes shall have burr and cutting slag removed by reaming or other cleaning methods.

3.1.4 All open ends of pipes shall be properly capped or plugged to keep dirt and other foreign materials out of the system. Plugs of rags or similar materials shall not be used in plugging.

3.1.5 Hangers and support shall be as hereinbefore specified. The use of pipe hooks, chains, or perforated iron for pipe supports shall not be permitted. Riser clamps shall be placed at each floor or ceiling level and at each coupling or fitting.

3.1.6 Contractor shall take every precaution to remove dirt, grease, and all other foreign matter from each length of piping before making connections in the field.

3.2 **PIPE HANGER INSTALLATION**:

3.2.1 All hangers shall be proper size for the pipe supported. Insulated pipes shall have hangers outside insulation and have metal saddles in place as insulation is installed.

3.2.2 Hanger rods shall be not less than the following sizes:

Pipe size (inches)	**Max. load** (lbs/rods)	**Rod Size** (in. dia.)
1-1/2 to 2	610	3/8
2-1/2 to 3	1130	1/2
3-1/3 to 5	1810	5/8

3.2.3 Hanger spacing shall be as follows:

Pipe	Max. Span (feet)
Steel pipe, 1-1/2	10’
Cast iron, 5' lengths	5’
Cast iron, 10' lengths	10’

3.2.4 Hanger spacing for cast iron soil, waste, and vent piping shall not be greater than the standard pipe lengths with hangers placed behind hubs at joints and hangers placed at all changes of direction and at fittings.

3.3 **CLEANOUTS**: Provide at the base of each RDL stack, waste stack, and at each change in direction of RDL and waste liens. On straight pipe runs, cleanouts shall be provided at intervals not exceeding 75 feet for size 4 inches and larger and 50 feet for size 3 inches and smaller.

3.4 **EACH FIXTURE AND PIECE OF EQUIPMENT** requiring connection to the sanitary drainage system except fixtures with continuous waste shall be equipped with a trap. Traps are specified to be supplied with the fixtures. Each trap shall be placed as near to the fixture as possible. Fixtures shall not be double- trapped. Traps installed on hub and spigot pipe shall be the same material and weight as specified for soil piping. Slip joints will be permitted only in trap seals or on the inlet side of the traps. Hub drainage fittings shall be used for making union connections wherever practical in connection with vents. Long screws and bushings are prohibited.

3.5 **JOINTS**:

3.5.1 All Joints: Make permanently gas and watertight.

3.5.2 Mechanical Joints (above ground): Gaskets shall be free of defects before installing. Install completely seated in accordance with manufacturer's directions.

3.5.3 Screwed Joints (above ground and below ground): Make threaded pipe ends and couplings and fittings with a pipe joint lubricant equal to "Rutland" pipe cement applied to the male threads of pipe ends.

3.5.4 Soldered Joints: Make with cleaned pipe ends and cleaned fittings. Flux: Paste type applied to the surfaces to be joined.

3.6 **FLASHING AND WATERPROOFING**:

3.6.1 Flashing for waterproofing floors of wet areas around floor drain will be provided by the General Contractor. The Plumbing Contractor shall coordinate with the General Contractor and set the required floor drains and/or cleanouts at the proper level and location at such time that the General Contractor may properly connect waterproofing to the specified clamping devices.

3.6.2 Flashing for waterproofing of small floor areas such as shower stalls (individual) and mop receptors (if integral with floor construction) shall be furnished and installed by the Plumbing Contractor. Refer to the drawing details for such flashing requirements.

3.6.3 Base flashing for vent piping penetrating roofs shall be furnished by the Plumbing Contractor and installed by the General Contractor. Flashings for vent pipes shall extend up the vent pipes a minimum of 12". The counterflashing (cap flashing) shall be furnished and installed by the Plumbing Contractor. The counterflashing shall be formed and soldered to the base flashing. Lead flashings for cast iron pipe vents shall be turned down into the pipes for hubs. Flashing shields shall extend not less than 8" from the vent pipe in all directions.

3.6.4 Flashing for piping penetrating intermediate and ground floor construction shall be furnished and installed by the Plumbing Contractor except where flashing is an integral construction unit of the floor. Where such flashing is required and noted on the drawings, the Plumbing Contractor shall furnish and install pipe flashing collars complete with flashing clamps.

END OF SECTION 15411

SECTION 15430 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 **SCOPE OF WORK**: Provide all plant, labor, materials, and equipment necessary to insulate the following plumbing systems as indicated on the accompanying drawings and as specified in this document.

1.1.1 Cold water piping and fittings. Below and above concrete floor slab.

1.1.2 Hot water supply and return piping and fittings. Below and above concrete floor slab.

1.2 **RELATED WORK BY OTHERS**:

1.2.1 In accordance with good piping practice, pipe fittings and connections shall be pressure-tested before Armaflex Insulations are applied.

1.2.2 In accordance with good design and installation practices, all outdoor surfaces shall shed water and not permit formation of standing puddles.

1.2.3 Where special corrosion-resistant coatings are specified for metal surfaces, they shall be compatible with Armstrong 520 Adhesive.

1.2.4 All piping, tubing, and fittings shall be installed with a minimum spacing of 2" between parallel pipes and with a minimum spacing of 1" between pipe and adjacent surfaces. (Pipe temperatures below 0 degrees F require special spacing).

1.2.5 Hangers and saddles: Hangers and saddles shall be sufficient size to support the pipe and insulation. Hangers and saddles must be positioned so that there is a sufficient space allowed for full insulation thickness and supporting devices such as woodblocks and cork stoppers.

1.3 **SUBMITTALS**:

1.3.1 Furnish Armstrong Literature and Data:

Armaflex Pipe Insulation product data sheet.

Armstrong 520 Adhesive data sheet.

WB Armaflex Finish data sheet.

1.3.1 Applicable Publications

1.3.1.1 American Society of Testing and Materials (ASTM)
C 177 Steady-State Thermal Transmission Properties by Means of Guarded Hot Plate, Test for

1.3.1.2 C 518 Steady State Thermal Transmission Properties by Means of Heat-Flow Meter, Test for

1.3.1.3 E84 Surface-Burning Characteristics of Building Materials, Test for

1.3.2 Thermal Conductivity:

1.3.3 Surface Burning Characteristics

1.3.3.1 Surface-Burning Characteristics of Armaflex Pipe Insulation in thickness of 3/4" or less when tested by ASTM E 84:

1.3.3.1.1 Flame-spread rating: 25 or less

1.3.3.1.2 Smoke-developed rating: 50 or less

PART 2 - PRODUCTS

2.1 Armaflex Pipe Insulation as manufactured by Armstrong.

2.1.1 For pipe temperatures from minus 40 degrees F to 220 degrees F; kfactor = 0.27.

2.1.2 Adhesive shall be 520 Adhesive as manufactured by Armstrong.

2.1.3 Finishing Materials:

2.1.3.1 Finish shall be WB Armaflex Finish as supplied by Armstrong.

2.1.4 Sealers:

2.1.4.1 Sealer shall be commercially available latex caulk.

2.2 **INSULATION WALL THICKNESS** shall conform to the following schedule:

2.2.1 Cold Water Piping: 1/2 inch thick

2.2.2 Hot Water Supply Piping: 1/2 inch thick

2.2.3 Hot Water Supply Piping: 1/2 inch thick

PART 3 - EXECUTION

3.1 Installation shall be in accordance with Armstrong - published Installation Instructions

3.2 **PIPE INSULATION**:

3.2.1 Seal all joints and seams of Armaflex Insulations on pipes with 520 Adhesive.

3.2.2 Install Armaflex Pipe Insulation by slipping complete sections over the open ends of piping or tubing. Seal butt joints.

3.2.3 Install Armaflex Pipe Insulation by slitting tubular sections and applying them around piping or tubing. Seal butt joints and slit seams.

3.2.4 At pipe hanger locations, insert short lengths of wood dowels or woodblocks between the hanger support saddle and the pipe to prevent Armaflex Insulations from being compressed.

3.3 **FITTING INSULATION**:

3.3.1 Fabricate fitting covers from Armaflex Insulations according to the manufacturer's directions. Join slit seams and mitered joints with 520 Adhesive.

3.4 **FINISHES - INDOOR PIPING**:

3.4.1 Concealed Locations - no finish is required over Armaflex Insulation indoors.

3.4.2 Exposed Locations - Apply commercially available high- quality interior enamel or latex enamel paint, according to the manufacturer's directions, directly to the Armaflex Insulation surface with sufficient coats to provide satisfactory hiding qualities.

END OF SECTION 15430

SECTION 15432 - PLUMBING TESTS, CLEANING AND STERILIZATION

PART 1 - GENERAL

1.1 **SCOPE OF WORK**: Provide all plant, labor, materials, services, and equipment required to test all equipment systems, and repair or replace defective systems or component parts. Adjust as required to meet the design intent. Clean all equipment and fixtured furnished and/or installed under this work contract.

1.2 **WORK INCLUDED**:

1.2.1 Pressure testing of piping systems.

1.2.2 Placing into proper operation all electrical and/or plumbing equipment including existing equipment interrupted for reworking alteration.

1.2.3 Rodding all soil, waste and vent piping systems.

1.2.4 Cleaning and sterilization of water supply system.

PART 2 - PRODUCTS

2.1 **FURNISH ALL** instruments, test equipment, and the personnel required for performing the testing, cleaning, and sterilization. All fuel, water, and electricity shall be furnished by the General Contractor in accordance with the General Conditions.

PART 3 - EXECUTION

3.1 **THE COLD WATER AND HOT WATER SUPPLY** and return piping systems shall be hydrostatically tested at a pressure of 1-1/2 times the normal working pressure or 150 psig, whichever is greater for a minimum of 24 hours with a drop in pressure of not more than 1% discounting the effect of temperature.

3.2 **THE GAS FUEL PIPING SYSTEM** shall be air-tested at 25 psig minimum pressure for not less than 10 minutes with no drop in pressure.

3.3 **DRAIN, WASTE, VENT, AND ROOF DRAINAGE SYSTEMS**:

3.3.1 Water Test: The entire drainage and venting, system shall be tested as a single unit or in sections provided that a vertical stack of 10 feet above the highest horizontal line of the section is tested integrally with that part of section. A pressure of 10 feet head shall be maintained throughout the section being tested for a 15-minute minimum time period with no drop of water level at the highest stack.

3.3.2 Air Test: If tests are made with air, a pressure of not less than 5 psig shall be applied with a force pump and maintained at least 15 minutes without leakage. A mercury column gauge shall be used in making the air test.

3.3.3 At closing of all new and renovation work, the Contractor shall employ the services of a qualified subcontractor who will completely rod and flush out all soil, waste, and vent piping systems. This work shall include rodding all fixtures, removing all cleanouts and rodding with a steel tape. The subcontractor shall certify that the building is free of stoppages in writing to the Engineer. If a stoppage is found, it shall be removed by the Contractor at no additional cost to the Owner.

3.4 **ALL WORK**, underground or normally concealed in the building, shall remain uncovered until the required tests have been completed, but in the event that the project construction schedule requires it, the Contractor shall make arrangements for prior tests on the portions of the work involved.

3.5 **DEFECTIVE WORK**: If inspection or test shows defects such defective work or material shall be replaced and inspection and tests repeated. Repairs to piping shall be made with new material.

3.6 **CLEANING AND STERILIZING**:

3.6.1 After satisfactory completion of tests and inspection, all parts of the work shall be thoroughly cleaned. All equipment, pipe, valves, and fittings shall be cleaned of grease, metal cuttings, and sludge which may have accumulated by operation of the system by testing. Any stoppage or discoloration or damage to parts of the building, its finish or furnishings, due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor without cost to the Owner. At the completion of the work, flush valves and other parts of the work shall be adjusted for quiet operation. Automatic control devices shall be adjusted for proper operation. Sink strainers shall be removed and cleaned.

3.6.2 Before being placed in service all new water piping shall be flushed and sterilized by chlorination in accordance with the American Water Works Association Standard AWWA C601-81, except as specified otherwise. The chlorine solution shall contain at least 50 parts per million of chlorine and shall remain in the system at least 24 hours. Sterilization shall include all hydrants. Pipe, taps, and fittings used at connections to existing piping shall be thoroughly sterilized before installation. Excavation for such connections shall be kept free from water until the connection is completed, and great care shall be exercised to prevent contamination of the existing pipe and connection fittings. Inject or deposit by hand at inside of the existing pipe within 3 feet of new to existing piping joint sufficient granule or liquid chlorine to provide not less than 200 ppm of chlorine in the fabricated pipeline when the pipeline is flooded during test. If at any time, in the opinion of the Engineer, foreign matter or possible contaminants enter the existing piping, or if samples show the water from the pipes to be unsafe on completion, the existing piping shall be sterilized as specified for new piping, back to the nearest gate valve or valves on existing piping and beyond those points as necessary to include all contaminated piping. On completion of the sterilizing, the piping shall be flushed thoroughly, samples shall be taken and tested by the Local Board of Health, or a recognized testing laboratory, and the water approved as fit and safe for human consumption before acceptance. Should the samples show the water unsafe, the piping shall be resterilized until satisfactory tests are obtained.

END OF SECTION 15432

SECTION 15435 - PLUMBING PENETRATION SEALANTS

PART 1 - GENERAL:

1.1 **RELATED DOCUMENTS:**

1.1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

1.2 **GENERAL DESCRIPTION OF THE WORK OF THIS SECTION:**

1.2.1 Work, in general, includes furnishing and installing fire and smoke barrier penetration seals for openings in floors, walls, and other elements of construction.

1.3 **RELATED WORK OF OTHER SECTIONS:**

1.3.1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections.

1.4 **QUALITY ASSURANCE:**

1.4.1 **APPLICATOR QUALIFICATIONS:** Two years experience installing UL Classified fire stopping materials.

1.4.2 **PERFORMANCE:** Materials shall have been tested to provide fire rating equal to that of the construction.

1.5 **SUBMITTALS:**

1.5.1 Submit shop drawings showing each condition requiring penetration seals in dictating proposed UL systems materials, anchorage, methods of installation, and actual adjacent construction. Submit a copy of UL illustration of each proposed system indicating manufacturer approved modifications.

1.5.2 **MANUFACTURER'S DATA:** Submit copies of manufacturer's specifications, recommendations, installation instructions, and maintenance data for each type of material required. Included letter indicating that each material complies with the requirements and is recommended for the applications shown.

1.5.3 **APPLICATOR'S QUALIFICATIONS STATEMENT:** List past projects indicating required experience.

1.6 **DELIVERY, STORAGE, AND HANDLING:**

1.6.1 Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, grade, and UL label where applicable.

1.6.2 Coordinate delivery with scheduled installation date to allow minimum storage time at site.

1.6.3 Store materials in clean, dry, ventilated location. Protect from soiling, abuse, and moisture. Follow manufacturer's instructions.

1.7 **PROJECT CONDITIONS:**

1.7.1 **EXISTING CONDITIONS:** Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

1.7.2 **ENVIRONMENTAL REQUIREMENTS:**

Furnish adequate ventilation if using solvent.
Furnish forced air ventilation during installation if required by manufacturer. Keep flammable materials away from sparks or flame. Provide masking and drop cloths to prevent contamination of adjacent surfaces by fire stopping materials.

1.8 **GUARANTEE:**

1.8.1 Submit copies of written guarantee agreeing to repair or replace joint sealers which fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The guarantee period shall be one year from date of substantial completion.

PART 2 - PRODUCTS

2.1 **ACCEPTABLE MANUFACTURERS:**

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

Proset Systems
Specified Technologies, Inc.
3M Fire Stopping Products

2.2 **MATERIALS:**

2.2.1 Provide materials classified by UL to provide fire stopping equal to time rating of construction being penetrated.

2.2.2 Provide asbestos free materials that comply with applicable codes and have been tested under positive pressure in accordance with UL 1479 or ASTM E 814.

PART 3 - EXECUTION

3.1 **PREPARATION:**

3.1.1 Clean surfaces to be in contact with penetration seal materials, of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.2 **INSTALLATION:**

3.2.1 Install penetration seal materials in accordance with printed instruction of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.

3.2.2 Seal holes or voids made by penetrations to ensure an effective smoke barrier.

3.2.3 Where floor openings without penetrating items are more than four inches in width and subject to traffic or loading, install fire stopping materials capable of supporting same loading as floor.

3.2.4 Protect materials from damage on surfaces subject to traffic.

3.3 **FIELD QUALITY CONTROL:**

3.3.1 Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.

3.3.2 Keep areas of work accessible until inspection by applicable code authorities.

3.3.3 Perform under this section patching and repairing of fire stopping caused by cutting or penetration by other trades.

3.4 **ADJUSTING AND CLEANING:**

3.4.1 Clean up spills of liquid components.

3.4.2 Neatly cut and trim materials as required.

3.4.3 Remove equipment, materials and debris, leaving area in undamaged, clean condition.

END OF SECTION 15435

SECTION 15440 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 **DESCRIPTION OF WORK:** Extent of plumbing fixtures work required by this section is indicated on drawings and schedules, and by requirements of this section.

1.2 **TYPES OF PLUMBING FIXTURES:** Specified in this section include the following:

Lavatories
Service sinks/Mop basins
Showers
Water closets
Sinks
Drinking Fountains

1.3 **REFER TO DIVISION 16 SECTIONS:** for field installed electrical wiring required for water coolers and other plumbing fixtures; not work of this section.

1.4 **CODES AND STANDARDS:**

1.4.1 **PLUMBING FIXTURE STANDARDS:** Comply with applicable portions of Standard Building Plumbing Code with North Carolina 1997 revisions pertaining to materials and installation of plumbing fixtures.

1.4.2 **ANSI STANDARDS:** Comply with applicable ANSI standards pertaining to plumbing fixtures and systems.

1.4.3 **PDI COMPLIANCE:** Comply with standards established by PDI pertaining to plumbing fixtures supports.

1.4.4 **FEDERAL STANDARDS:** Comply with applicable FS WW-P- 541/Series sections pertaining to plumbing fixtures.

1.4.5 **UL COMPLIANCE:** Construct water coolers in accordance with UL Standard 399 "Drinking-Water Coolers", and provide UL listing and label.

1.4.6 **ASHRAE COMPLIANCE:** Test and rate water coolers in accordance with ASHRAE Standard 18 "Method of Testing for Rating Drinking Water Coolers with Self-Contained Mechanical Refrigeration Systems".

1.4.7 **ARI COMPLIANCE:** Construct and install water coolers in accordance with ARI Standard 1010 "Drinking-Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers", and provide Certification Symbol.

1.4.8 **ANSI COMPLIANCE:** Construct and install barrier-free plumbing fixtures in accordance with ANSI Standard A117.1 "Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People", and ADA (American Disabilities Act) requirements.

1.4.9 **COMPLY:** with Public Law 90-480, known as the Architectural Barriers Act of 1968.

1.5 **SUBMITTALS:**

1.5.1 **PRODUCTS DATA:** Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, furnished specialties and accessories; and installation instruction.

1.5.2 **SHOP DRAWINGS:** Submit manufacturer's assembly-type shop drawings indicating dimensions, roughing-in requirements, required clearances, and methods of assembly of components and anchorage's.

1.5.3 **SAMPLES:** Submit samples of each cabinet finish furnished, and fixture color furnished.

1.5.4 **MAINTENANCE DATA:** Submit maintenance data and parts lists for each type of plumbing fixture and accessory; including "trouble-shooting" maintenance guides. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.

1.6 **DELIVERY, STORAGE AND HANDLING:**

1.6.1 **DELIVER PLUMBING FIXTURES** individually wrapped in factory-fabricated containers.

1.6.2 **HANDLE PLUMBING FIXTURES** carefully to prevent breakage, chipping and scoring fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

PART 2 - PRODUCTS

2.1 **PLUMBING FIXTURES:** (see schedule on drawings)

2.1.1 **GENERAL:** Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture trim, carrier, seats, and valves as specified, and as required for complete installation.

2.1.2 **MATERIALS:**

2.1.2.1 **GENERAL:** Unless otherwise specified, comply with applicable Federal Specification WW-P-541/Series sections pertaining to plumbing fixtures, fittings, trim, metals and finishes. Comply with requirements of WW-P-541/specification relative to quality of ware, glazing, enamel, composition and finish of metals, air gaps, and vacuum breakers, even though some plumbing fixtures specified in this section are not described in WW-P-541.

2.1.2.2 **PROVIDE MATERIALS WHICH HAVE BEEN** selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting seam marks, roller marks, foundry sand holes, stains, decoloration, or other surface imperfections on finished units are not acceptable.

2.1.2.3 **WHERE FITTINGS, TRIM AND ACCESSORIES ARE EXPOSED** or semi-exposed provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.

2.1.2.4 **STAINLESS STEEL SHEETS:** ASTM A167, Type 302/304, hardest workable temper.

Finish: No. 4, bright, directional polish on exposed surfaces.

2.1.2.5 **STEEL SHEETS FOR BAKED ENAMEL FINISH:** ASTM A 591, coating Class C, galvanized-bonderized.

2.1.2.6 **STEEL SHEETS FOR PORCELAIN ENAMEL FINISH:** ASTM A 424, commercial quality, Type I.

2.1.2.7 **GALVANIZED STEEL SHEET:** ASTM A526, except ASTM A527 for extensive forming; ASTM A 525, G90 zinc coating, chemical treatment.

2.1.2.8 **ALUMINUM:** ASTM B 209/B 221 sheet, plate, and extrusions, as indicated; alloy, temper and finish as determined by manufacturer, except 0.40 mil natural anodized finish on exposed work unless another finish is indicated.

2.1.2.9 **VITREOUS CHINA:** High quality, free from fire cracks, spots, blisters, pinholes and specks; glaze exposed surfaces, and test for crazing resistance in accordance with ASTM C554.

2.2 **PLUMBING FITTINGS, TRIM AND ACCESSORIES:**

2.2.1 **WATER OUTLETS:** At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.

2.2.2 **VACUUM BREAKERS:** Provide with flush valves where required by governing regulations, including locations where water outlets are equipped for hose attachment.

2.2.3 **P-TRAPS:** Include cast brass, (chrome plated where exposed), P-traps where drains are indicated for direct connection to drainage system. PVC P-Traps are acceptable.

2.2.4 **FIXTURE BOLT CAPS:** Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.

2.2.5 **ESCUTCHEONS:** Where fixture supplies and drains penetrate walls in exposed locations, provide chrome-plated cast- brass escutcheons with set screw.

2.2.6 **AERATOR:** Provide 2.0 GPM aerators for all lavatory faucets and 2.2 GPM aerators for all sink faucets.

2.2.7 **COMPLY:** with additional fixture requirements contained in fixture schedule attached to this section.

2.3 **ACCEPTABLE MANUFACTURERS:**

2.3.1 **AVAILABLE MANUFACTURERS:** Submit to compliance with requirements, manufacturers offering plumbing fixtures which may be incorporated in the work include the following:

2.3.2 **MANUFACTURER:** Subject to compliance with requirements, provide plumbing fixtures of one of the following:

2.3.2.1 **CHINA FIXTURES**

Mansfield Plumbing Products, Inc.(#137-160)
Kohler Co.
American Standard, Inc.
Eljer Industries
Universal - Rundle Corp.

2.3.2.2 **FIXTURE SEATS**
Church Seat Co.
Bemis Mfg. Co.
Centoco Mfg. Corp.
Olsonite Corp.

2.3.2.3 **FAUCETS**
American Standard, Inc.
Kohler Co.
Moen, Inc.
Zurn Industries, Inc.; Temp-Gard Operations

2.3.2.4 **ACCESSORIES**
McGuire Manufacturing Co.
Engineered Brass Co.

2.3.2.5 **SHOWER STALLS**
Clarion Fiberglass Manufacturing, Inc.
Universal-Rundle Corp.
Aqua-Glass Corp.
Comfort Care

2.3.2.6 **SHOWER VALVES**
American-Standard, Inc.
Symmons Industries, Inc.
Zurn Indsutries, Inc.; Temp-Gard Operations

2.3.2.7 **STAINLESS SINKS**
Just Manufacturing Co.
Moen, Inc.
Elkay Manufacturing Co.

2.3.2.8 **MOP BASIN**
Stern Williams Co, Inc.
Fiat Products, Inc.
Florestone Products, Inc.

PART 3 - EXECUTION

3.1 **INSPECTION:** Examine roughing-in work of potable water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 **INSTALLATION OF PLUMBING FIXTURES:**

3.2.1 **GENERAL:** Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of North Carolina State Plumbing Code (latest edition) pertaining to installation of plumbing fixtures.

3.2.3 **FASTEN PLUMBING FIXTURES SECURELY** to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.

3.3 **FEED QUALITY CONTROL:**

3.3.1 **UPON COMPLETION OF INSTALLATION OF PLUMBING FIXTURES** and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

3.3.2 **INSPECT EACH INSTALLED UNIT** for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect/Engineer. Remove cracked or dented units and replace with new units.

3.4 **ADJUSTING AND CLEANING:**

3.4.1 **CLEAN PLUMBING FIXTURE**, trim, and strainers of dirt and debris upon completion of installation.

3.4.2 **ADJUST WATER PRESSURE** at drinking fountains, faucets, shower valves, and flush valves to provide proper flow stream and specified/required gpm.

3.2.3 **ADJUST OR REPLACE WASHERS** to prevent leaks at faucets and stops.

3.5 **EXTRA STOCK:**

3.5.1 **GENERAL:** Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every 10 units.

END OF SECTION 15440

SECTION 15460 - PLUMBING PUMPS

PART 1 - GENERAL

1.1 **DESCRIPTION OF THE WORK**: Provide and install as shown on the drawings:

1.1.1 Hot water circulating pump(s)

1.2 **SUBMITTALS**: Furnish the following:

1.2.1 Manufacturer's literature and data.

1.2.1.1 Pump:

Manufacturer and model
Operating speed
Capacity
Characteristics performance curves

1.2.1.2 Motor:

Manufacturer, frame and type
Speed
Current characteristics and HP

1.3 Complete operating and maintenance manuals including wiring diagrams, technical data sheets and information for ordering replaceable parts.

PART 2 - PRODUCTS

2.1 **CIRCULATING PUMP**: Use for hot water systems. Pump for hot water system shall be designed for 150 degrees F water service. Centrifugal, single stage, constructed to prevent contact of water with metal other than nonferrous, (all bronze or stainless steel). Driver shall be electrical motor, close coupled or connected by flexible coupling.

2.2 **MOTORS**: 40 degrees C ambient temperature rise, open dripproof, for operation with voltage, phase and cycle shown in schedule on drawings, conforming the NEMA standards. Capacity to operate pump without overloading. In-line pump motors shall not exceed 1800 rpm and be provided with spring mountings or other devices to assure quiet operation.

2.2.1 Pump shall operate through a strap-on Aquastat, with "on- off" automatic switch and timer controller.

2.3 **ACCEPTABLE MANUFACTURERS**:

Grunfos
Bell & Gossett

PART 3 - EXECUTION

3.1 **GENERAL**: The recirculation system shall be balanced to deliver water at each fixture promptly. Adjust all balance valve(s) as required to equalize the system. Coordinate with the Owner the usage of the building and set time accordingly. Install "Aquastat" for operation during off-peak periods.

END OF SECTION 15460

SECTION 15535 - PIPE AND PIPE FITTINGS (REFRIGERANT AND CONDENSATE)

PART 1 - GENERAL

1.1 **INCLUDED IN THIS SECTION**:

1.1.1 All pipe, pipe fittings, hangers, supports, etc., as may be required to provide a complete refrigerant piping system.

1.2 **TESTING**:

1.2.1 Testing of all piping shall be made in the presence of a designated representative of the Owner. No piping shall be covered or put into operation before such testing has been approved.

1.3 **ARRANGEMENT OF PIPING**:

1.3.1 Arrangement of piping shall follow the general locations shown on the drawings such that clearances, line drainage, etc., shall be maintained.

PART 2 - PRODUCT

2.1 **PIPING**:

2.1.1 Refrigerant Piping shall be type "ACR" hard drawn copper conforming to ANSI B-31.5 or ASTM B280.

2.1.2 Condensate drain piping shall be type "L" hard drawn copper conforming to ASTM B-88 or Schedule 40 PVC.

2.2 **COPPER PIPE FITTINGS**:

2.2.1 Copper pipe fittings shall be wrought metal solder joint type conforming to ANSI B16.22.

2.3 **PIPE SOLDER**:

2.3.1 Pipe solder shall be of the silver solder type with a minimum of 15% silver.

PART 3 - EXECUTION

3.1 **PIPING**:

3.1.1 Installation of piping and related items shall be made neatly and in such a manner as not to interfere with access to valves or equipment.

3.1.2 All piping shall be reamed to remove all burrs, fins and foreign material. Pipe shall be thoroughly cleaned before soldering.

3.1.3 Silver solder shall be used with non-corrosive flux. During the soldering operation, the pipe shall be purged with nitrogen.

3.1.4 Piping shall be arranged (and traps installed where necessary) to allow the proper return of oil to the compressor.

3.1.5 P-Traps shall be installed on each condensate drain. Piping shall be connected so that the trap and evaporator drain pan may be easily cleaned.

3.2 **HANGERS AND SUPPORTS**:

3.2.1 Spacings of hangers and supports shall not exceed five (5) feet.

3.2.2 Refer to plans for any special details related to supporting refrigeration pipe and system related conduits.

3.2.3 Pipe covering protection saddles shall be used at all supports for insulated piping. Sheet metal saddles shall be 10-gauge, one half the circumference of the insulation and minimum of twelve inches long.

3.3 **TESTING**:

3.3.1 All refrigerant equipment not tested at the factory shall be shut off from the rest of the system and tested.

3.3.1.1 Piping systems shall be tested after installation is complete and before any insulation is applied.

3.3.1.2 All controls and other apparatus that may be damaged by the test pressure shall be removed before tests are made.

3.3.2 Refrigerant lines shall be tested at 150 psig with dry nitrogen.

3.3.2.1 Pressure shall be maintained for 60 minutes without loss of pressure.

3.3.2.2 Each joint shall be checked for leaks with a soap solution.

3.3.2.3 Testing and repair shall continue until there is no loss of pressure.

3.3.2.4 After a satisfactory pressure test, high vacuum pumps (DO NOT USE THE SYSTEM COMPRESSOR) shall be connected to the system and the system evacuated to a pressure of 0.20 inches of mercury with the system ambient temperature at not less than 36-deg. F. After this has been attained, the vacuum pump shall be valved off from the system. The vacuum shall be broken by charging system with refrigerant vapor as soon as possible.

END OF SECTION 15535

SECTION 15732 – PACKAGED ROOFTOP AIR-CONDITIONING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

1.1.1 Package roof top unit.

1.1.2 Heat exchanger.

1.1.3 Refrigeration components.

1.1.4 Unit operating controls.

1.1.5 Roof curb.

1.1.6 Electrical power connections.

1.1.7 Operation and maintenance service.

1.2 RELATED SECTIONS

1.2.1 Section 15170 - Motors.

1.2.2 Section 15242 - Vibration Isolation.

1.2.3 Section 15290 - Ductwork Insulation.

1.2.4 Section 15885 - Air Cleaning.

1.2.5 Section 15952 - Controls and Instrumentation.

1.2.6 Section 16180 - Equipment Wiring Systems.

1.3 REFERENCES

1.3.1 NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.

1.3.2 ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.

1.3.3 AHRI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard.

1.3.4 ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment.

1.3.5 ANSI/ASHRAE/IESNA 90.1-1999 - Energy Standard for New Buildings Except Low-Rise Residential Buildings.

1.3.6 ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.

1.3.7 California Energy Commission Administrative Code - Title 20/24 - Establishes the minimum efficiency requirements for HVAC equipment installed in new buildings in the State of California.

1.3.8 AHRI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.

1.3.9 ANSI/NFPA 70-1995 - National Electric Code.

1.4 SUBMITTALS

1.4.1 Submit unit performance data including: capacity, nominal and operating performance.

1.4.2 Submit Mechanical Specifications for unit and accessories describing construction, components and options.

1.4.3 Submit shop drawings indicating overall dimensions as well as installation, operation and services clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.

1.4.4 Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.

1.4.5 Shop drawings submitted for approval shall be accompanied by a copy of the purchase agreement between the Contractor and an authorized service representative of the manufacturer for check, test and start up and first year service.

1.5 DELIVERY, STORAGE and HANDLING

1.5.1 Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.5.2 Protect units from physical damage. Leave factory shipping covers in place until installation.

1.6 **WARRANTY**

1.6.1 Provide parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.

1.6.2 Provide five year extended warranty for compressors.

1.6.3 Provide five year heat exchanger limited warranty.

1.7 **MAINTENANCE SERVICE**

1.7.1 Provide maintenance service with a two month interval as maximum time period between calls. Provide 24-hour emergency service on breakdowns and malfunctions.

1.7.2 Include maintenance items as outlined in manufacturer's operating and maintenance data.

1.7.3 Submit copy of service call work order or report and include description of work performed.

1.8 **REGULATORY REQUIREMENTS**

1.8.1 Unit shall conform to ANSI Z21.47/UL1995 for construction of packaged air conditioner.

1.8.2 In the event the unit is not UL approved, the manufacturer must, at his expense, provide for a field inspection by a UL representative to verify conformance to UL standards. If necessary, contractor shall perform modifications to the unit to comply with UL, as directed by the UL representative, at no additional expense to the Owner.

1.9 **EXTRA MATERIALS**

1.9.1 Provide three sets of filters.

1.9.2 Furnish a complete set of fan motor drive belts.

PART 2 PRODUCTS

2.1 SUMMARY

2.1.1 The contractor shall furnish and install package rooftop unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

2.1.2 APPROVED MANUFACTURERS

2.1.2.1 Trane

2.1.2.2 Carrier

2.1.2.3 Lennox

2.1.2.4 Substitutions: [10 working days prior approval required] as indicated under the general and/or supplemental conditions of these specifications. Mechanical contractor shall be responsible for electrical and mechanical changes to the structure when using a product other than the specified product. As built drawing changes are the responsibility of the mechanical contractor.

2.2 GENERAL UNIT DESCRIPTION

2.2.1 Unit(s) furnished and installed shall be gas/electric packaged rooftop (s) as scheduled on contract documents and these specifications. Cooling capacity ratings shall be based on AHRI Standard. Unit(s) shall consist of insulated weather-tight casing with compressor(s), air-cooled condenser coil, condenser fans, evaporator coil, return-air filters, supply motors and unit controls.

2.2.2 Unit(s) shall be 100% factory run tested and fully charged with R-410A.

2.2.3 Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.

2.2.4 Units shall be dedicated downflow or dedicated horizontal airflow as manufactured.

2.2.5 Wiring internal to the unit shall be colored and numbered for identification.

2.3 UNIT CASING

2.3.1 Cabinet: Galvanized steel, phosphatized, and finished with an air-dry paint coating with removable access panels. Structural members shall be 16 gauge with access doors and removable panels of minimum 20 gauge.

2.3.2 Units cabinet surface shall be tested 1000 hours in salt spray test in compliance with ASTM B117.

2.3.3 Cabinet construction shall allow for all service/ maintenance from one side of the unit.

2.3.4 Cabinet top cover shall be one piece construction or where seams exits, it shall be double-hemmed and gasket-sealed.

2.3.5 Access Panels: Water- and air-tight panels with handles shall provide access to filters, heating section, return air fan section, supply air fan section, evaporator coil section, and unit control section.

2.3.6 Downflow unit's base pans shall have a raised 1 1/8 inch high lip around the supply and return openings for water integrity.

2.3.7 Insulation: Provide 1/2 inch thick coated fiberglass insulation on all exterior panels in contact with the return and conditioned air stream.

2.3.8 Provide openings either on side of unit or thru the base for power, control and gas connections.

2.3.9 The base of the unit shall have provisions for forklift and crane lifting

2.4 FANS AND MOTORS

2.4.1 Provide evaporator fan section with forward curved, double width, double inlet, centrifugal type fan.

2.4.2 Provide self-aligning, grease lubricated, ball or sleeve bearings with permanent lubrication fittings.

2.4.3 Provide units 12 1/2 tons and above with belt driven, supply fans with adjustable motor sheaves.

2.4.4 Outdoor and Indoor Fan shall be permanently lubricated and have internal thermal overload protection.

2.4.5 Outdoor fans shall be direct drive, statically and dynamically balanced, draw through in the vertical discharge position.

2.4.6 Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

2.5 DELIVERED VAV

2.5.1 Unit shall be provided with VFD (Variable Frequency Drive) on Indoor fan motor. VFD shall change fan speed according to mode of operation. The VFD shall receive a 0-10 Vdc signal from the unit controls based upon supply static pressure and shall cause the drive to accelerate or decelerate as required to maintain the supply static pressure setpoint. When subjected to high ambient return conditions the VFD shall reduce its output frequency to maintain operation.

2.6 GAS FIRED HEATING SECTION

2.6.1 Completely assembled and factory installed heating system shall be integral to unit, UL or CSA approved specifically for outdoor applications for use downstream from refrigerant cooling coils. Threaded connection with plug or cap provided. Provide capability for gas piping.

2.6.2 Heating section shall be factory run tested prior to shipment.

2.6.3 Gas Burner shall be forced combustion type power burner, negative pressure gas valve, manual shut-off, hot surface ignition, and flame sensing safety control.

2.6.4 Gas Burner Safety Controls: Provide safety controls for the proving of combustion air prior to ignition, and continuous flame supervision. Upon a failure to ignite, two attempts of ignition will occur before lockout of the ignition system.

2.6.5 Combustion blower shall be centrifugal type fan with built- in thermal overload protection on fan motor.

2.6.6 Heat Exchanger: Provide drum and tube heat exchanger of free floating design manufactured from 18-gauge aluminized steel, factory pressure and leak tested.

2.6.7 Limit controls: High temperature limit controls will shut off gas flow in the event of excessive temperatures resulting from restricted indoor airflow or loss of indoor airflow.

2.7 **EVAPORATOR COIL**

2.7.1 Provide configured aluminum fin surface mechanically bonded to copper tubing coil.

2.7.2 Provide an independent expansion device for each refrigeration circuit. Factory pressure test at 450 psig and leak test at 200 psig.

2.7.3 Provide drain pan for base of evaporator coil constructed of PVC or galvanized steel with external connections.

2.8 **CONDENSER SECTION**

2.8.1 Provide vertical discharge, direct drive fans with aluminum blades. Fans shall be statically balanced. Motors shall be permanently lubricated, with integral thermal overload protection in a weather tight casing.

2.9 **REFRIGERATION SYSTEM**

2.9.1 Compressor(s): Provide scroll compressor with direct drive operating at 3600 rpm. Integral centrifugal oil pump. Provide suction gas cooled motor with winding temperature limits and compressor overloads.

2.10 **EXHAUST/RETURN SECTION**

2.10.1 Provide, on downflow units above 6 1/4 tons, a factory supplied field installed power exhaust assembly that shall assist the barometric relief damper in the economizer in relieving building pressurization.

2.11 **OUTDOOR AIR SECTION**

2.11.1 Provide 100% return air.

2.11.2 Provide economizer with differential enthalpy control.

2.11.3 Provide adjustable minimum position control located in the economizer section of the unit.

2.11.4 Provide spring return motor for outside air damper closure during unit shutdown or power interruption.

2.12 OPERATING CONTROLS

2.12.1 Provide factory-wired roof top units with 24-volt control circuit with control transformers, contactor pressure lugs or terminal block for power wiring. Contractor to provide disconnect switch. Units shall have single point power connections. Field wiring of zone controls to be NEC Class II.

2.12.2 Provide microprocessor unit-mounted control which when used with an electronic zone sensor provides proportional integral room control. This UCM shall perform all unit functions by making all heating, cooling and ventilating decisions through resident software logic.

2.12.3 Provide factory-installed indoor evaporator defrost control to prevent compressor slugging by interrupting compressor operation.

2.12.4 Provide an anti-cycle timing and minimum on/off between stages timing in the microprocessor.

2.12.5 Economizer Preferred Cooling (if supplied with economizer) - Compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements. Compressors are enabled if space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute. Compressor low ambient lockout overrides this function.

2.13 STAGING CONTROLS

2.13.1 Provide NEC Class II, electronic, adjustable zone control to maintain zone temperature setting.

2.13.2 Provide programmable electronic microcomputer based zone control.

2.13.2.1 Zone control shall incorporate:

2.13.2.1.1 Automatic changeover from heating to cooling.

2.13.2.1.2 Set-up for at least 2 sets of separate heating and cooling temperatures per day.

2.13.2.1.3 Instant override of setpoint for continuous or timed period from one hour to 31 days.

2.13.2.1.4 Switch selection features including Fahrenheit display, 12- or 24-hour clock, keyboard disable, remote sensor, fan on-auto.

2.13.2.2 Zone sensor display shall be capable of:

2.13.2.2.1 Time of day.

2.13.2.2.2 Actual room temperature.

2.13.2.2.3 Programmed temperature.

2.13.2.2.4 Programmed time.

2.13.2.2.5 Duration of timed override.

2.13.2.2.6 Day of week.

2.13.2.2.7 System mode indication: heating, cooling, low battery fan on.

2.13.3 Provide remote temperature sensor capability.

2.13.4 Provide mixed air sensor in supply air to close outside air damper.

2.14 BUILDING MANAGEMENT SYSTEM

2.14.1 Interface control module to Energy Management System to be furnished and mounted by rooftop unit manufacturer. Through this interface module, all Energy Management functions (specified in Energy Management Section) shall be performed. See Building Automation and Automatic Temperature Control System Specifications. The interface module with necessary controls and sensors shall all be factory mounted (not field mounted). If not furnished by rooftop unit manufacturer, this shall be furnished by Energy Management System Contractor for factory mounting by rooftop unit manufacturer in rooftop unit and rated for service up to 140 F. The only field connection to Energy Management System shall be a single communication link.

2.14.2 Control Functions: Include unit scheduling, occupied/unoccupied mode, start-up and coast-down modes, nighttime free-cool purge mode, demand limiting, night setback, discharge air set point adjustment, timed override and alarm shutdown.

2.14.3 Diagnostic Functions: Include supply fan status.

2.14.4 Provide capabilities for Boolean Processing and trend logs as well as "templated" reports and logs.

2.15 **UNIT PERFORMANCE REQUIREMENTS**

2.15.1 Supply air fan performance data as submitted shall include the effect of a wet coil, and the return air filter static loss.

2.15.2 Scheduled performance shall be based on AHRI 210/240/340/360 and ANSI Z21.47 test conditions.

2.15.3 See Packaged DX Cooling/Gas Heating Rooftop Unit Schedule for more information.

2.16 **ROOF CURB**

2.16.1 Contractor shall provide factory supplied roof curb, 16-gauge perimeter made of zinc coated steel with supply and return air gasketing and wood nailer strips. Ship knocked down and provided with instructions for easy assembly.

2.16.2 Curb shall be manufactured in accordance with the National Roofing Contractors Association guidelines.

PART 3 EXECUTION

3.1 **EXAMINATION**

3.1.1 Contractor shall verify that roof is ready to receive work and opening dimensions are sized appropriately.

3.1.2 Contractor shall verify that proper power supply is available.

3.2 **INSTALLATION**

3.2.1 Contractor shall install in accordance with manufacturer's instructions.

3.2.2 Mount units on factory-built roof mounting frame providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

3.3 **MANUFACTURER'S FIELD SERVICES**

3.3.1 The manufacturer shall furnish an alternative price for:

3.3.1.1 Extended compressor warranty for 5 years.

3.3.1.2 Extended heat exchanger warranty for 1 year.

3.3.1.3 Extended parts and labor by manufacturer to be provided to the owner for a period of 1 year.

3.3.2 The contractor shall furnish manufacturer complete submittal wiring diagrams of the package unit as applicable for field maintenance and service.

PART 4 SEQUENCE OF OPERATIONS

4.1 PACKAGED ROOFTOP UNITS (RTU)

4.1.1 Microprocessor controller - Each RTU shall be controlled by a stand-alone microprocessor based controller with resident control logic. The controller will interface with the BAS and the inputs and outputs in the points list to accomplish the following temperature control and energy conservation strategies.

4.1.1.1 Occupied Mode - All unit functions will be enabled for normal heating and cooling operation. Unit defaults to default temperature setpoints in the unit microprocessor when communication with BAS is lost.

4.1.1.2 Occupied Space Temperature Control - When in occupied mode as described above, the dedicated unit control shall operate stages of heating and cooling to maintain space temperature setpoint. Setpoints may be set by one of the following methods:

4.1.1.2.1 Remotely through BAS by the system operator;

4.1.1.2.2 Locally through the thermostat by the occupant;

4.1.1.2.3 Locally through the thermostat by the occupant within limits defined through the BAS by the system operator;

4.1.1.2.4 Operator may designate wild card setpoints to apply to any or all of the RTU's through the BAS.

4.1.2 Optimal Start Mode - When the unit is turned on by the BAS for optimal start, heating or cooling is provided as required. The outside air dampers, if provided, remains closed, in heating mode or mechanical cooling mode, until occupied time. Economizer cycle, if supplied, will be available if required.

4.1.3 Coastdown Mode - When the unit is turned "OFF" by the BAS for optimal stop, the supply fan remains "ON/AUTO", the outside air damper remains in minimum position for ventilation, and utilizes the unoccupied setpoints.

4.1.4 Demand Limit Mode - Through the BAS a user defined Demand Limit Mode shall be available. User defines maximum off time and temperature to ensure occupant comfort.

4.1.5 Night Setback Temperature Control - When the BAS selects unoccupied mode, the unit shall be controlled to maintain user defined unoccupied heating and cooling setpoints. Adjustable start and stop temperature differentials will prevent short cycling. The outdoor air damper remains closed during heating night setback operation, if provided.

4.1.6 Economizer - Each RTU when equipped will measure and select lowest total heat air stream to meet cooling demands. When using return air, the outside air damper will be position at a minimum position. The minimum position will be adjustable by the operator or through the BAS software.

4.1.7 Nighttime Free-Cool Purge Mode - An "economizer only" cooling cycle shall be provided during unoccupied hours when outdoor air conditions are suitable and the zone requires cooling.

4.1.8 Low Ambient Compressor Lockout - Compressor operation shall be disabled below a user defined outdoor air temperature.

4.1.9 Timed Override - When a timed override is initiated by the user, the unit will return to its user defined normal occupied mode for the user determined period of time.

4.1.10 Fire Shutdown - The unit will shut down in response to a customer supplied contact closure to the BAS indicating the presence of a fire or other emergency condition.

4.1.11 Heat Pump Auxiliary Heat Lockout - Heat pump auxiliary heat operation shall be prevented above a user defined outdoor air temperature.

4.1.12 Emergency Heat Mode (Heat Pump units) - Shall be selectable at BAS. In emergency heat mode, compressors shall be locked out and auxiliary heat shall control for space comfort.

4.1.13 Unit status report - For each RTU unit, the BAS shall provide an operating status summary of all sensed values (zone temperature, discharge temperature, etc.) setpoints and modes.

4.1.14 Supply Air Tempering - When the unit is in the heat mode, but not actively heating, if the supply air temperature drops 10 degrees or more below the heating setpoint, heat is turned on until supply air temperature rises to a point 10 degrees above the heating setpoint.

4.1.15 Alternating Lead/Lag - (Dual Compressors Models Only), During periods of part load operation, each compressor cycles alternatively as circuit number one in order to equalize wear and run time.

4.1.16 Economizer Preferred Cooling - Compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements. Compressors are enabled if space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute. Compressor low ambient lockout overrides this function.

4.1.17 Diagnostic/Protection - The BAS system shall be able to alarm from all sensed points from the rooftop units and diagnostic alarms sensed by the unit controller. Alarm limits shall be designated for all sensed points.

END OF SECTION 237416.11

SECTION 15838 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 **SUMMARY**

1.1.1 Section Includes:

1.1.1.1 In-line centrifugal fans.

1.2 **ACTION SUBMITTALS**

1.2.1 Product Data: For each type of product indicated.

1.2.2 Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.2.2.1 Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.2.2.2 Wiring Diagrams: For power, signal, and control wiring.

1.2.2.3 Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.3 **CLOSEOUT SUBMITTALS**

1.3.1 Operation and maintenance data.

1.4 **QUALITY ASSURANCE**

1.4.1 Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4.2 AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

PART 2 – PRODUCTS

2.1 **CENTRIFUGAL FANS**

2.1.1 These fans are both belt driven and direct drive, usually with spun-aluminum housings, and are used for small ventilation requirements.

2.1.2 Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.

2.1.3 Direct-Drive Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.

2.1.4 Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.

2.1.5 Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.

2.2 MOTORS

2.2.1 Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.2.1.1 Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.2.2 Enclosure Type: Totally enclosed, fan cooled.

2.3 SOURCE QUALITY CONTROL

2.3.1 Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

2.3.2 Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 – EXECUTION

3.1 INSTALLATION

3.1.1 Equipment Mounting - provide vibration isolation devices to prevent sound transmission to the building.

3.1.2 Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

3.1.3 Support suspended units from structure using threaded steel rods and elastomeric hangers having a static deflection of 1 inch (25 mm). Install units with clearances for service and maintenance.

3.1.4 Label units according to requirements specified in Section 15010 "General Provisions (Mechanical Contract)."

3.2 CONNECTIONS

3.2.1 Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors.

3.2.2 Install ducts adjacent to power ventilators to allow service and maintenance.

3.2.3 Ground equipment.

3.2.4 Mechanical contractor to make final wiring connections to fans.

3.3 FIELD QUALITY CONTROL

3.3.1 Perform tests and inspections.

3.3.1.1 Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.3.2 Tests and Inspections:

3.3.2.1 Verify that shipping, blocking, and bracing are removed.

3.3.2.2 Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.

3.3.2.3 Verify that cleaning and adjusting are complete.

3.3.2.4 Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.

3.3.2.5 Adjust belt tension.

3.3.2.6 Adjust damper linkages for proper damper operation.

3.3.2.7 Verify lubrication for bearings and other moving parts.

3.3.2.8 Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.

3.3.2.9 Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.

3.3.2.10 Shut unit down and reconnect automatic temperature-control operators.

3.3.2.11 Remove and replace malfunctioning units and retest as specified above.

3.3.3 Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.3.4 Prepare test and inspection reports.

3.4 ADJUSTING

3.4.1 Adjust damper linkages for proper damper operation.

3.4.2 Adjust belt tension.

3.4.3 Comply with requirements in Section 15990 "Test, Adjust, Balance, and Start-up" for testing, adjusting, and balancing procedures.

3.4.4 Replace fan and motor pulleys as required to achieve design airflow.

3.4.5 Lubricate bearings where required.

END OF SECTION 233423

SECTION 15840 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 **SUMMARY**

1.1.1 Section Includes:

1.1.1.1 Fan-powered air terminal units.

1.2 **ACTION SUBMITTALS**

1.2.1 Product Data: For each type of product indicated.

1.2.2 Shop Drawings: For air terminal units. Include plans, elevations, sections, details, and attachments to other work.

1.2.3 Delegated-Design Submittal:

1.2.4 Field quality-control reports.

1.3 **CLOSEOUT SUBMITTALS**

1.3.1 Operation and maintenance data.

1.4 **QUALITY ASSURANCE**

1.4.1 Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4.2 ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

PART 2 – PRODUCTS

2.1 **PERFORMANCE REQUIREMENTS**

2.1.1 Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

2.2 **PARALLEL FAN-POWERED AIR TERMINAL UNITS**

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

2.2.1.1 Titus.

2.2.1.2 METALAIRE, Inc.

2.2.1.3 Nailor Industries Inc.

2.2.1.4 Price Industries.

2.2.1.5 Trane.

2.2.1.6 Enviro Tech

2.2.1.7 Krueger.

2.2.2 Configuration: Volume-damper assembly and fan in parallel arrangement inside unit casing with control components inside a protective metal shroud.

2.2.3 Casing: 0.034-inch (0.85-mm) steel, single wall.

2.2.3.1 Casing Lining: Adhesive attached, 1/2-inch- (13-mm-) thick, coated, fibrous-glass duct liner complying with ASTM C 1071, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.

2.2.3.1.1 Cover liner with nonporous foil.

2.2.3.1.2 Cover liner with nonporous foil and perforated metal.

2.2.3.2 Air Inlets: Round stub connections or S-slip and drive connections for duct attachment.

2.2.3.3 Air Outlet: S-slip and drive connections.

2.2.3.4 Access: Removable panels for access to parts requiring service, adjustment, or maintenance; with airtight gasket and quarter-turn latches.

2.2.3.5 Fan: Forward-curved centrifugal, located at plenum air inlet.

2.2.3.6 Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.2.4 Volume Damper: Galvanized steel with flow-sensing ring and peripheral gasket and self-lubricating bearings.

2.2.4.1 Maximum Damper Leakage: ARI 880 rated, 2 percent of nominal airflow at 3-inch wg (750-Pa) inlet static pressure.

2.2.4.2 Damper Position: Normally open.

2.2.5 Velocity Sensors: Multipoint array with velocity sensors in cold- and hot-deck air inlets and air outlets.

2.2.6 Motor:

2.2.6.1 Provide with premium efficiency NEMA MG 1 motor with 1.15 service factor.

2.2.6.2 Type: ECM with SCR for speed adjustment.

2.2.6.3 Fan-Motor Assembly Isolation: Rubber isolators.

2.2.6.4 Motor Speed: Multispeed.

2.2.6.4.1 Speed Control: Infinitely adjustable with electronic controls.

2.2.7 Filters: Minimum arrestance according to ASHRAE 52.1 and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.

2.2.7.1 Material: Polyurethane foam having 70 percent arrestance and 3 MERV.

2.2.7.2 Material: Glass fiber treated with adhesive; having 80 percent arrestance and 5 MERV.

2.2.7.3 Material: Pleated cotton-polyester media having 90 percent arrestance and 7 MERV.

2.2.7.4 Thickness: 1 inch (25 mm).

2.2.8 Electric-Resistance Heating Coils: Nickel-chromium heating wire, free of expansion noise and hum, mounted in ceramic inserts in a galvanized-steel housing; with primary automatic, and secondary manual, reset thermal cutouts. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware.

2.2.8.1 Location: Plenum air inlet.

2.2.8.2 Stage(s): 1.

2.2.8.3 Access door interlocked disconnect switch.

2.2.8.4 Downstream air temperature sensor with local connection to override discharge-air temperature to not exceed a maximum temperature set point (adjustable.)

2.2.8.5 Nickel chrome 80/20 heating elements.

2.2.8.6 Airflow switch for proof of airflow.

2.2.8.7 Fan interlock contacts.

2.2.8.8 Fuses in terminal box for overcurrent protection (for coils more than 48 A).

2.2.8.9 Mercury contactors.

2.2.8.10 Magnetic contactor for each step of control (for three-phase coils).

2.2.9 Factory-Mounted and -Wired Controls: Electrical components mounted in control box with removable cover. Incorporate single-point electrical connection to power source.

2.2.9.1 Control Transformer: Factory mounted for control voltage on electric and electronic control units with terminal strip in control box for field wiring of thermostat and power source.

2.2.9.2 Wiring Terminations: Fan and controls to terminal strip. Terminal lugs to match quantities, sizes, and materials of branch-circuit conductors. Enclose terminal lugs in terminal box that is sized according to NFPA 70.

2.2.9.3 Disconnect Switch: Factory-mounted, fuse type.

2.2.10 Control Panel Enclosure: NEMA 250, Type 1, with access panel sealed from airflow and mounted on side of unit.

2.2.11 Electric Controls: 24-V damper actuator with wall-mounted electric thermostat and appropriate mounting hardware.

2.3 HANGERS AND SUPPORTS

2.3.1 Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

2.3.2 Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

2.3.3 Steel Cables: Galvanized steel complying with ASTM A 603.

2.3.4 Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

2.3.5 Air Terminal Unit Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

2.3.6 Trapeze and Riser Supports: Steel shapes and plates for units with steel casings; aluminum for units with aluminum casings.

2.4 SOURCE QUALITY CONTROL

2.4.1 Factory Tests: Test assembled air terminal units according to ARI 880.

2.4.1.1 Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, and ARI certification seal.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

3.1.2 Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

3.1.3 Install wall-mounted thermostats.

3.2 HANGER AND SUPPORT INSTALLATION

3.2.1 Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

3.2.2 Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

3.2.2.1 Where practical, install concrete inserts before placing concrete.

3.2.2.2 Install powder-actuated concrete fasteners after concrete is placed and completely cured.

3.2.2.3 Use powder-actuated concrete fasteners for standard-weight aggregate concretes and for slabs more than 4 inches (100 mm) thick.

3.2.2.4 Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes and for slabs less than 4 inches (100 mm) thick.

3.2.3 Hangers Exposed to View: Threaded rod and angle or channel supports.

3.2.4 Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.3 CONNECTIONS

3.3.1 Install piping adjacent to air terminal unit to allow service and maintenance.

3.3.2 Make connections to air terminal units with flexible connectors.

3.4 IDENTIFICATION

3.4.1 Label each air terminal unit with plan number, nominal airflow, and maximum and minimum factory-set airflows. Comply with requirements in Section 15010 "General Provisions (Mechanical Contract)" for equipment labels and warning signs and labels.

3.5 FIELD QUALITY CONTROL

3.5.1 Perform tests and inspections.

3.5.1.1 Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.5.2 Tests and Inspections:

3.5.2.1 After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.

3.5.2.2 Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

3.5.2.3 Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5.3 Air terminal unit will be considered defective if it does not pass tests and inspections.

3.5.4 Prepare test and inspection reports.

3.6 STARTUP SERVICE

3.6.1 Engage a factory-authorized service representative to perform startup service.

3.6.1.1 Complete installation and startup checks according to manufacturer's written instructions.

3.6.1.2 Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.

3.6.1.3 Verify that controls and control enclosure are accessible.

3.6.1.4 Verify that control connections are complete.

3.6.1.5 Verify that nameplate and identification tag are visible.

3.7 DEMONSTRATION

3.7.1 Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air terminal units.

END OF SECTION 233600

SECTION 15890 - DUCT AND ACCESSORIES (LOW PRESSURE)

PART 1 - GENERAL

1.1 **INCLUDED IN THIS SECTION**:

1.1.1 Are low pressure ductwork, (with velocities not exceeding 2000 FPM), splitter dampers, balancing dampers, air deflection devices, fire dampers, etc., required for a complete system.

1.2 **PLANS**:

1.2.1 Are intended to indicate, with reasonable accuracy, the location of components and general arrangement of the system. All offsets, bends, fittings, and other devices not shown but required for the full operation of the system shall be provided.

PART 2 - PRODUCT

2.1 **DUCTWORK**:

2.1.1 Shall be fabricated from the best quality galvanized sheet steel.

2.2 **SPLITTER DAMPERS**:

2.2.1 Balancing dampers, turning vanes, and air deflection devices shall be installed as shown on the plans and where required for the proper control of air flow.

2.3 **ROUND AND RECTANGULAR DUCTWORK**:

2.3.1 Shall be of gauges and construction methods as indicated in the latest ASHRAE Guide and SMACNA Standards.

2.4 **FIRE DAMPERS**:

2.4.1 The fire dampers shall be fabricated of galvanized steel meeting ASTM-A-525-65. The damper frame shall be of such design and length as to function as the mounting sleeve, thus eliminating the need for a separate sleeve. The damper frame/ sleeve shall be of a gauge as recommended in NFPA 90A, SMACNA Fire Damper Guide and UL requirements.

2.4.2 All fire dampers shall be UL labeled for the rating indicated on the plans. Fire dampers shall be dynamic type per the latest NFPA requirements. Fire dampers required for each fire separation whether or not specifically shown on the drawings. See Architectural plans and specifications for fire barriers.

2.4.3 All square or rectangular fire dampers shall be similar to Ruskin Fire Damper Model D1BD2 (Type "A").

2.4.4 Fire rated diffusers and grilles with radiation blanket shall be provided at all rated ceiling locations.

2.5 **DAMPERS**:

2.5.1 Provide all manual dampers of the sizes indicated on the plans.

2.5.2 Damper frames shall not be less than .125" extruded aluminum frames for extra strength with mounting holes for flange enclosed duct mounting.

2.5.3 All damper blades shall not be less than 20-gauge extruded aluminum air foil shape for high velocity performance. Blades on all dampers must not be over 8" wide and shall be silicon edged. Blade bearings shall be molded synthetic. All blade linkage hardware shall be corrosive-resistant zinc plated steel and be readily accessible for maintenance after installation.

2.5.4 Spring-loaded stainless steel side seals will be provided to insure leakage of not more than 6 CFM per square foot at 4" static pressure.

2.6 **INSTRUMENT TEST HOLES**:

2.6.1 Provide test holes Ventlok 69902 or submit other manufacturer for approval Owner and Architect/Engineer complete with gasket and heavy screw cap.

PART 3 - EXECUTION

3.1 **TURNING VANES**:

3.1.1 Shall be installed where indicated on the plans.

3.2 **DUCT TRANSITIONS**:

3.2.1 Splitter dampers and balancing dampers shall be constructed of gauges and materials as indicated in ASHRAE Guide and SMACNA Standards.

3.3 **HANGERS AND SUPPORTS**:

3.3.1 For ductwork shall be of metal bands, angles, and rods as indicated in ASHRAE Guide and SMACNA Standards.

3.4 **SPACE AROUND DUCTS**:

3.4.1 Shall be sealed in an approved manner when passed through floors and walls.

3.5 **EXPOSED AREAS**:

3.5.1 And mechanical room, ductwork openings shall be finished with a metal collar.

3.6 **CROSS BRACING**:

3.6.1 Of ductwork and proper reinforcement with galvanized steel angles shall be as recommended by SMACNA Standards.

3.7 **DUCTWORK BEHIND GRILLES**:

3.7.1 Or where diffusers are visible, two coats of flat black base fire retardant paint shall be applied.

3.8 **DUCT CONNECTIONS**:

3.8.1 To outside air louvers shall be pitched to drain outside and shall be made watertight.

3.9 **JOINTS**:

3.9.1 Shall be caulked with Silicone RTV or use "ductmate" type with gaskets approved equal for completely airtight system.

3.10 **DUCTS**:

3.10.1 Shall be airtight, rigid and free from vibration and noise.

3.11 **DIMENSIONS**:

3.11.1 Of ducts shown on the drawings are Net Inside Dimensions.

3.12 **FIRE DAMPER INSTALLATION**:

3.12.1 Shall comply with NFPA-90A, SMACNA-I and SMACNA Fire Damper Guide. Fire damper sleeve shall not be attached to wall or slab, but retained on both sides by a 16-gauge angle frame attached to sleeve by welds or #10 x 1/2 sheet metal screw or 1/4 x 1/2 bolts - not over 12-inches on center. This angle frame also closes all clearance between sleeve and wall or slab. Fire damper installation shall comply with manufacturer's accepted UL approved system number installation.

3.13 **ACCESS DOORS**:

3.13.1 Required as shown on plans and where necessary to provide access for all fire dampers, coils, damper motors, dampers, bearings, etc. Sizes shall be approximately 12" square wherever possible or as indicated on the plans. Larger access doors shall be used for large fire dampers where additional access space is needed for resetting of damper and damper maintenance. Construction shall be panel type, insulated where adjoining duct or casing is insulated in accordance with SMACNA-I construction details.

3.14 These shall show all offsets and transitions planned. However, it is a certainty that bends, elbows, offsets, and transitions, will be required that are not initially planned, and these offsets and transitions shall be made at no additional cost to the Owner. New duct shapes shall give the same duct velocities and pressure drops as was in the original design.

3.15 **INSTRUMENT TEST HOLES**:

3.15.1 Test holes shall be provided at the following locations:

3.15.2 Each discharge duct from air handling units.

3.15.3 Each return duct to air handling units or plenum.

END OF SECTION 15890

SECTION 15936 - AIR DISTRIBUTION DEVICES

PART 1 - GENERAL

1.1 **SCOPE OF WORK**:

1.1.1 This work consists of furnishing all labor, materials, equipment, and services, necessary for the installation of air distribution devices for the heating, cooling, and ventilation systems as indicated on the plans, required and as specified.

PART 2 - PRODUCTS

2.1 **GRILLES AND REGISTERS**:

2.1.1 Provide where shown on the plans all metal or polymer diffusers, grilles and registers of the sizes and capacities indicated. Units shall be adaptable for use with walls as indicated on the architectural finish schedule.

2.1.2 All supply grilles indicated on plans shall be double deflection or louver type as shown on schedules.

2.1.3 Grille shall have white baked enamel finish and shall be Titus, as scheduled, or approved equal by Metalaire, Price, Krueger.

2.1.4 In all cases, a schedule of grilles and registers shall be prepared and submitted to the Architect and Engineers for approval of size and design of outlets before they are ordered for installation.

PART 3 - EXECUTION:

3.1 **INSTALLATION**:

3.1.1 Install all equipment and appurtenances in strict accordance with approved shop drawings and manufacturer's recommendations.

3.1.2 Duct drops to diffusers shall be equal to, or larger than the diffuser frame.

END OF SECTION 15936

SECTION 15975 - CONTROLS AND INSTRUMENTATION

PART 1 - GENERAL

1.1 **SCOPE:** This work consists of furnishing all labor, materials, equipment components and services necessary for interlock and/or temperature control of all items of mechanical equipment as indicated on the plans, as specified, and as required for a complete control system.

1.2 **SHOP DRAWINGS:**

1.2.1 This Contractor shall prepare and submit to the Architect for approval, before erection of any control apparatus, separate reproducible control diagrams. A copy of each of the approved diagrams corrected to show as-built conditions shall be frames under glass and hung where directed.

1.2.2 A diagram showing electric control and interlock wiring shall be provided in a similar manner.

1.2.3 A reproducible mylar autopositive showing as-built temperature control and interlock wiring shall be delivered to the Owner prior to application for final payment.

PART 2 - PRODUCTS

2.1 **PACKAGED AIR CONDITIONING UNITS (PACU'S):**

2.1.1 Control Thermostats shall be by Johnson Controls. Submit control device selections for approval by Owner and Architect/Engineer.

2.2 **FANS EF-1 and EF-4:** Fans shall be controlled with a switch.

2.3 **FANS EF-2 AND EF-3:** Fans shall be controlled with room lights.

2.4 **GENERAL:** Include all transformers, switches, conduit, wiring, etc., to make the system complete. All wiring shall be in metallic raceway and materials and workmanship shall comply with the specifications for the electrical contract and concealed in structure wherever possible. Electrical wiring shall conform to NEC and all applicable code.

2.5 **PACU's:** See mechanical drawings for sequence of operations.

2.5.2.1 The air conditioning unit control circuit shall be wired through the smoke detector auxiliary contactors to shut down the unit detector if in alarm. Provide audio/visual alarm and connect to duct-mounted smoke detector. The detector is furnished by others and installed by a mechanical contractor.

PART 3: EXECUTION

3.1 **Control Equipment** shall be calibrated and adjusted and systems placed into operation. This shall include a systematic operational check of all control devices with particular attention to the following:

3.1.1 Operation of safety controls, firestats, flow switches, etc., to ensure they perform their intended function; i.e., sound alarm, stop fan, etc.

3.1.2 Check of all dampers for proper opening and closing, making sure that they close tight and that their linkage is properly adjusted and locked. Discharge temperature check of mixing dampers shall be performed in both open and closed position to ensure their proper operation and tight closing. Any deficiencies in equipment furnished by others for correction shall be reported.

3.1.3 Sequence of all equipment operated by changeover devices, such as, day-night, etc. shall be checked out. Thermostat shall be set for proper operation.

3.1.4 A competent technician shall be provided to instruct Owner's operating personnel and two (2) copies of maintenance manuals shall be turned over which covers the functions and operation of all control components in the various systems.

3.2 **SYSTEM CONTROL SEQUENCE DESCRIPTION:** Control equipment and devices shall be furnished, installed, connected, and placed into operation to provide the sequence of operation specified on the drawings.

END OF SECTION 15975

SECTION 15990 - TEST, ADJUST, BALANCE, AND START-UP

PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**:

1.1.1 The General and Supplementary Conditions and General Requirements (Division 1), apply to the work specified in this Section.

1.2 **SCOPE**:

1.2.1 The Contractor shall provide services to balance and air moving equipment and air distribution systems as herein specified. Work shall be done under direct supervision of a qualified test and balance engineer. All instruments used shall be accurately calibrated and maintained in good working order. If requested, the tests shall be conducted in the presence of the Engineer responsible for the project design and/or his representative.

1.2.2 Air balance and testing shall not begin until system has been completed and is in full working order. The Contractor shall put heating, ventilating and air conditioning systems and equipment into full operation during each working day of testing and balancing.

1.3 **TEST DATA**:

1.3.1 Contractor shall provide test results in tabulated formats as described. All measurements shall be made after air balance has been performed and recorded. After all tests have been received and evaluated by the engineer, a final inspection will be scheduled.

1.3.2 The Contractor shall include all adjusted, i.e., actual CFM readings across the system coil. The actual and design quantities shall be shown.

1.4 **OPERATING INSTRUCTIONS**:

1.4.1 Instruction in correct operating procedures and maintenance of the mechanical installation shall be given in person by the Contractor or his qualified representative, to available members of the building operating personnel for a period of not less than three days at the time of initial test adjust and start-up.

1.4.2 Typewritten operating instructions, automatic control system diagrams and a control sequence description shall be prepared, 10-mil plastic laminated reduced prints, and mounted in a location dictated by the Owner or Architect.

1.5 **FINAL INSPECTION AND FINAL ACCEPTANCE**:

1.5.1 Of the installation shall, in addition to the foregoing requirements, be subject to the following conditions:

1.5.2 Air flow measuring devices and the methods of which such instruments are employed shall be accurate to within ± 2% and chart instruments shall be accurate to within ±1%.

1.5.3 The completed test data sheets and correlation of the test data of air and water balance results shall be certified to be true and correct over the signature of the Contractor, and such signature shall be executed by an officer, if the Contracting firm is a corporation, a partner, if a partnership, and/or by the Contractor himself if a sole ownership.

PART 2 - PRODUCTS

2.1 **MATERIALS**:

2.1.1 All necessary test equipment, instruments, materials, and labor required for performing all tests as hereinafter described shall be furnished as a part of the work of this Section.

PART 3 - INSTALLATION

3.1 **AIR BALANCING**:

3.1.1 Test and adjust fan system to verify proper function.

3.1.2 Test and record motor full load amperes.

3.1.3 Make pitot tube traverse of main supply ducts and obtain design CFM at all supply diffusers and return grilles.

3.1.4 Test and record system static pressure, suction and discharge.

3.1.5 Test and adjust system for design recirculated air CFM.

3.1.6 Test and record entering air temperatures (DB cooling).

3.1.7 Test and record entering air temperatures (WB cooling).

3.1.8 Test and record leaving air temperatures (DB cooling).

3.1.9 Test and record leaving air temperatures (WB cooling).

3.1.10 Adjust all main supply and return air ducts to proper design CFM.

Adjust all zones to proper design CFM, supply and return.

3.1.11 Test and adjust each diffuser, grille and register to within ±10% of design requirements.

3.1.12 Each grille, diffuser and register shall be identified as to location and area.

3.1.13 Size, type and manufacture of diffusers, grilles, registers, and tested equipment shall be identified and listed. Manufacturer's ratings on equipment shall be used to make required calculations.

3.1.14 Readings and tests of diffusers, grilles and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustment.

3.1.15 Coordinate with the control manufacturer's representative setting adjustments of automatically operated dampers to operate as specified.

3.1.16 All diffusers, grilles and registers shall be adjusted to minimize drafts in all areas.

3.1.17 The Contractor shall make any changes in the pulleys, belts and dampers or the addition of dampers required for correct balance at no additional cost to the Owner.

3.1.18 Balancing for air systems shall be done with clean filters installed in units. (NOTE: Contact Contractor with maintenance contract for clean filters.)

END OF SECTION 15990

SECTION 15999 - ELECTRICAL WORK

PART 1 - GENERAL

1.1 **SCOPE**:

1.1.1 The Electrical Subcontractor shall be responsible for the power wiring to equipment. The Mechanical Subcontractor shall provide all control wiring and final electrical connections to mechanical equipment installed as part of his contract.

1.1.2 This subcontractor shall review the electrical plans to coordinate points of connection to his equipment by others and to determine the extent of the electrical work to be provided in his contract.

1.1.3 All control wiring shall meet or exceed the requirements of Division 16 of these specifications.

1.1.4 All electrical work shall be performed by a licensed electrician.

PART 2 - PRODUCT

2.1 **CONTROL SYSTEM WIRING**:

2.1.1 Shall conform to the requirements set forth by NEC and amplified in Division 16 of these specifications.

2.2 **CONDUIT**:

2.2.1 Refer to electrical specifications for conduit and wiring requirements.

PART 3 - EXECUTION

3.1 **ELECTRICAL CONNECTION**:

3.1.1 To equipment subject to vibration which develops objectionable noises shall be made from the conduit system with short lengths of flexible "Liquid-Tite" conduit, but shall not exceed 6 feet in length.

3.2 **CONNECTION**:

3.2.1 To other equipment shall be made with flexible metallic tubing.

END OF SECTION 15999

SECTION 16000 - GENERAL PROVISIONS ELECTRICAL SYSTEM

PART 1 - GENERAL

1.1 **Description**:

1.1.1 This section describes the requirements for a complete, operating electrical system, including but not limited to, the following items:

1.1.1.1 New electrical service entrance to building from utility transformer including service entrance conduit duct bank, main service entrance gear and distribution panel.

1.1.1.2 New electrical distribution system including distribution panels and feeders in conduit system.

1.1.1.3 Installation of underground conduit for telephone and cable television service.

1.1.1.4 New lighting fixtures, wall switches, receptacles, and similar items.

1.1.1.5 New branch circuit panelboards and associated wire and conduit.

1.1.1.7 Installation of certain cable/conduit/junction boxes, etc. for Owner furnished CATV and telecommunications system.

1.1.1.8 Installation of complete door monitoring and alarm system including wire/conduit detectors and alarm panels.

1.1.2 Related work described elsewhere:

1.1.2.1 Section 15010: General Provisions (Mechanical Contract).

Section 15999: Electrical Work

Section 15975: Controls and Instruments

1.2 **QUALIFICATION OF INSTALLERS**:

1.2.1 All work shall be performed by licensed electricians or under the strict supervision of a licensed electrician.

1.3 **CODES AND STANDARDS**:

1.3.1 All work shall be in accordance with the latest revision of applicable local, state, and federal regulations, codes, or specifications, the National Electrical Code, 2017 edition, National Electrical Safety Code and Underwriter's Laboratories, Inc. (UL).

1.3.2 All materials shall be new and approved by Underwriter's Laboratories, Inc. for the use intended.

1.4 **SUBMITTALS**:

1.4.1 Materials List: Before installation of any materials or equipment, submit four copies for the Owner's approval, a complete list of all materials and equipment proposed for installation. The list shall be supplemented by catalog cuts, diagrams, lighting fixture brochures, shop drawings, field working drawings, and such descriptive data as may be required to fully describe the electrical items.

1.4.2 Record Drawings: Upon completion of the installation, submit marked prints of drawings showing any changes made in circuits, locations of equipment, panel board directories, or any other revisions in the drawings.

1.4.3 Inspection Certificate: Provide a certificate of final inspection and approval from the electrical inspection department having jurisdiction.

1.5 **EQUIPMENT IDENTIFICATION**:

1.5.1 Each item of electrical equipment installed shall be identified by etched laminated plastic nameplate, in addition to the manufacturer's nameplate. The plastic plate shall clearly identify the item or its intended use and shall be securely fastened to the equipment with sheet metal screws.

1.5.2 Nameplates for equipment shall be white letters on black background.

1.5.3 Special systems junction boxes shall be color coded (cover only) as follows:

Fire Alarm System - Red
Door Security - Brown

1.5.3.1 Empty conduits for telecommunications or cable TV do not require special markings.

1.6 **PAINTING**:

1.6.1 Any equipment furnished with a factory applied color shall be touched up upon completion of the electrical installation to repair any damaged surfaces.

1.6.1.1 All wiring shall be concealed in walls or ceilings.

1.6.2 All exposed conduit, boxes and cabinets where shown on the drawings and/or approved by the Owner, shall be primed by the Electrical Contractor and painted by the General Contractor. Installation work shall be coordinated so that all the building interior is painted at one time.

1.7 **COORDINATION WITH OTHER TRADES:**

1.7.1 Electrical items shall be installed so as to not interfere with the other building systems (HVAC ductwork and equipment, plumbing and telephone equipment) which must occupy this same general space. The Electrical Subcontractor shall be responsible for scheduling his work to avoid delays and sequence work with other contractors to permit orderly completion of the project.

1.7.2 Electrical contractor shall prepare for use by the General Contractor, sketches and drawings as necessary to indicate penetrations in wall, floors and roofs for conduit and other electrical items.

1.8 **CUTTING AND PATCHING**:

1.8.1 Cutting and patching of exterior walls for the electrical system installation shall be provided by the General Contractor.

1.9 **PENETRATIONS**:

1.9.1 Penetrations in fire rated walls and floors shall be fire stopped as required to maintain the fire rating of the assembly. (See section 07950).

END OF SECTION 16000

SECTION 16070 - TESTING

PART 1 - GENERAL

1.1 **SUMMARY**: Provide for complete testing of every system installed under this work.

1.1.1 A complete test of the entire electrical power, lighting, grounding, and special systems furnished, installed or otherwise provided under this contract shall be performed by the Contractor at no additional expense to the Owner.

1.1.2 Every component of every system shall be exercised as part of the test or tests.

1.1.3 Testing shall continue until every system has been shown to be free from any defect and operating as designed by the manufacturer and as required by the contract documents.

1.2 **RELATED WORK SPECIFIED ELSEWHERE**: Additional testing may be found in other sections of these specifications.

1.3 **SUBMITTALS**: Provide reports documenting systems testing and performance evaluations required by these specifications.

PART 2 - PRODUCTS

2.1 **Any Equipment, Device, or Material** which does not perform within the tolerance of a code acceptable performance, the manufacturer's published performance data, or the requirements of the contract documents shall be considered defective.

2.2 **CONTENT**: All reports documents shall, as a minimum, include the date and time of the test(s), conditions, equipment/instruments used, procedures followed, and the results obtained.

PART 3 - EXECUTION

3.1 **GENERAL**: The Contractor shall furnish all equipment (safety and testing), devices, instruments, load banks, fuels, and materials necessary to perform the required tests.

3.1.1 Provide the Engineer with the date and time of each system test at least 7 days prior to the scheduled testing date. Failure to notify the Engineer in sufficient time may require the Contractor to perform the required testing AGAIN.

3.1.2 All equipment and materials found to be defective shall be replaced in kind by the Contractor in accordance with all guarantees required as part of the construction documents and at no additional cost to the Owner prior to final acceptance. Defective equipment and material shall become the property of the Contractor and shall be promptly removed from the site.

3.2 **OTHER REQUIRED TESTING**:

3.2.1 Provide all testing required by the manufacturer to properly check the installation of his equipment.

3.2.2 As required by other sections of these specifications and as required for compliance with local, state, and national codes, or for acceptance by the authorities having jurisdiction.

3.3 **FINAL ACCEPTANCE**: Replace in kind prior to final acceptance all fuels, materials, renewable parts, etc., used, damaged, or expended during testing.

END OF SECTION 16070

SECTION 16101 - ELECTRICAL DISTRIBUTION

PART 1 - GENERAL

1.1 **DESCRIPTION**:

1.1.1 This section describes the requirements for furnishing and installing the building electrical system, including conduit and fittings, wire and cable, wiring devices, and branch circuit panelboards.

1.1.2 All materials to be installed shall be new and UL listed for the particular use as identified on the drawings.

1.1.3 Electrical service for the building is a 120/208 Volts, three phase, 4 wire system supplied via pad mounted transformer as shown on the drawings.

PART 2 - PRODUCTS

2.1 Wiring Devices:

2.1.1 Duplex convenience receptacles: 20-amp, 125-volt, 3-wire grounding type, Hubbell No. 5200/5300 series, white. Leviton or Bryant are acceptable.

2.1.2 All other outlets shall be as specified on the drawings.

2.1.3 Wall switches shall be totally enclosed tumbler type as follows:

2.1.3.1 Single pole - 20 amp, 120/277 volts, Hubbell No. 1201 (white). Leviton or Bryant are acceptable.

2.1.3.2 Three way - 20 amp, 120/277 volts, Hubbell No. 1203 (white). Leviton or Bryant are acceptable.

2.1.4 Designer dimmer switches shall be slide type, single pole or three-way where indicated and compatible with the type of lighting fixtures being secured. Lutron "Skylark" Series (120V) with on/off preset switch, 1000W capacity. Dimmers shall be white in color,

2.1.5 Standard dimmer switches shall be slide type, single pole or three-way where indicated and compatible with the type of lighting fixtures being secured. Lutron "Nova" Series (120V) 1500W capacity. Dimmers shall be white in color.

2.1.6 Device plates to be smooth nylon, white; Hubbell No. P8W/P1W series or approved equal. The plates shall be of the same manufacturer as the wiring device for flush- type outlets.

2.1.6.1 Disconnect switches shall be Square D heavy duty Type or other manufacturer approved by Owner and Architect / Engineer and as required by the National Electrical Code. Provide fuses sized for each motor's running protection where shown on the drawings and/or required as indicated on equipment nameplates.

2.1.6.2 Combination motor starter/disconnect switches shall be full voltage, horsepower rated across-the-line type with 120V contactor coils. Each combination starter/disconnect shall be provided with a hand-off-automatic device with a pilot lamp for the "run" mode. Provide a set of auxiliary N.O., N.C. contacts each device for remote/automatic operation.

2.1.7 Branch circuit panelboards shall be dead front type with the designated number of single, double, and triple pole circuit breakers. Panel bussing shall be all copper construction with fully rated neutral. Provide door in door hinged construction with clear plastic directory holder on the inside of the door.

2.2 Conduit and Fittings:

2.2.1 Where shown on the drawings or required by the NEC, conduit shall be rigid galvanized or IMC conduit (except as noted below) with compression or tap-on type fittings. Indenter fittings are not acceptable. Minimum size is 1/2".

2.2.2 Electrical metallic tubing (EMT) will be permitted only where indicated on the drawings. EMT shall conform to all requirements of the National Electrical Code.

2.2.3 Rigid nonmetallic conduit (PVC) will be permitted as indicated on the drawings. PVC shall conform to all requirements of the National Electrical Code.

2.2.4 For short equipment connections and connections to motor equipment, liquid-tight, flexible conduit shall be provided and shall be "seal tight" Type UA, as manufactured by American Brass or other submitted manufacturer approved by Owner and Architect/Engineer.

2.2.5 Outlets, junction boxes and switch boxes, wall outlet boxes for recessed switches, and receptacles shall be "CW" series as manufactured by Steel City or other manufacturer approved by Owner and Architect/Engineer. All outlet boxes shall conform to UL Standard 514-1991. Ceiling and junction boxes shall be galvanized steel not smaller than 4-inches octagon by 1-1/2 inches deep as manufactured by Steel City, National, Appleton, or approved equal. On all exterior surface-mounted wiring, use cast galvanized boxes and junction boxes with threaded hubs.

2.2.6 Boxes shall have sufficient volume to accommodate the number of conductors as required by Article 370 of the National Electrical Code. Boxes shall be constructed of code-gauge galvanized sheet metal with covers attached using sheet metal screws.

2.2.7 Provide sleeves and chases where conduits pass through floor and walls.

2.3 Conductors:

2.3.1 Wire and cable to be of copper, unless otherwise specified, the AWG size shown on the drawings with insulation indicated below. Conductors shall conform to latest NEC requirements and meet ASTM specifications. Conductors shall be Class B stranding. Solid conductors may be used for lighting circuits only. Minimum wire size shall be No. 12 AWG except for thermostat or low level control cable. Wire size, voltage rating, insulation type, and manufacturer shall be clearly marked on the conductor jacket at regular intervals. Conductors with the following types of insulation shall be installed in locations indicated and/or shown on drawings. Conductors and cables shall be manufactured by General Electric, Anaconda, or Simplex.

2.3.1.1 Type THHN/THWN for No. 12 and larger branch circuits. (Circuits of 600 volts or less).

2.3.1.2 Nonmetallic sheathed cable (NM, ROMEX) shall be permitted as indicated on the drawings.

2.3.1.3 Bare conductors or Type THWN/THHN green for ground wire. Ground wire for all circuits shall be sized in accordance with NEC Table 250-95.

2.3.2 Conductors for branch circuits whose length from panel to load exceeds 100 feet shall be increased to the next larger size, unless a size larger than minimum is shown on the drawings.

2.3.3 Equipment lug ratings shall be coordinated with wire insulation type so that no de-rating or conductors results from failure to properly install these devices.

2.4 Telecommunications System: Provide all empty conduits, wiring and outlets as indicated on the drawings.

2.5 **OPTIONAL INSTALLATIONS**:

2.5.1 Voice and Data Cabling: Install Owner furnished cable where shown on drawings. (Section 16721)

2.5.2 CATV: Install Owner furnished cable where shown on drawings. (Section 16720)

2.5.3 Telephone: Install Owner furnished cable where shown on drawings. (Section 16720)

PART 3 - EXECUTION

3.1 Surface Conditions: Verify that the work of this section may be performed in strict accordance with all pertinent codes and regulations, the original design, and manufacturer's recommended installation methods prior to performing any of the work of this section. In the event of a discrepancy, notify the Owner.

3.2 Preparation:

3.2.1 Coordination: Where lighting fixtures and other electrical items are shown in conflict with locations of structural members or mechanical or other equipment, provide all required supports and wiring to clear the encroachment.

3.2.2 Location and Measurements: Outlets, devices, fixtures, and appliances are shown on the drawings in their approximate locations. Take necessary measurements in the field for exact locations and match work to the building construction. The outlets for special appliances must be installed so they will be in the proper location when the appliances are installed.

3.2.3 Circuiting: Circuits are shown schematically. Installation shall be as shown on drawings except by written permission of the Owner.

3.3 Installation of Conduit and Fittings:

3.3.1 Concealment: All work shall be concealed in walls, partitions, ceilings, and floors unless specifically indicated as being exposed.

3.3.2 Installation:

3.3.2.1 Exposed conduit shall be installed with runs parallel or perpendicular to walls and ceilings with right-angle turns utilizing outlet boxes or symmetrical bends.

3.3.2.2 Conduit, joints, boxes, etc., in all exterior exposed area shall be gasketed and made weatherproof to permit cleaning by personnel.

3.3.2.3 Exposed conduits shall be securely fastened in place on no more than 6-foot centers for up through 1 inch and on 8-foot centers for all sizes larger than 1 inch; and hangers, supports, or fastenings shall be provided at each elbow and at the end of each straight run terminating at a box or cabinet. Horizontal and vertical conduit runs may be supported by one-hole malleable straps, clampbacks, or other approved device with suitable bolts, expansion shields where needed, or beam clamps for mounting to building structure or special brackets. Adjustable hangers may be used to suspend conduits when separately located. If adjustable trapeze hangers are used to support groups of parallel conduits, U-bolt type clamps shall be used at the end of conduit run and at end elbow. U-bolts or approved clamps shall be installed on each third intermediate trapeze hanger to fasten each conduit.

3.3.2.4 Where rigid conduit is connected to EMT, such connection shall be made in a junction or outlet box with each conduit terminated separately therein.

3.3.2.5 Conduit ends shall be cut square, threaded, and reamed to remove burrs and sharp edges. Field threads shall be of same type and have same effective length as factory- cut threads. Conduit joints shall be made with approved couplings. Bends and offsets shall be avoided where possible; but where necessary, factory elbows shall be made with an approved hickey or conduit bending machine. Conduit deformed or crushed in any way shall not be installed, and bends with a radius of less than 3-1/2 inches will not be permitted. Conduit runs shall not have more than three 90 degree bends or equivalent between pull points.

3.3.2.6 Conduit shall be securely fastened to all sheet metal outlet, junction, cabinets, and pull boxes with double- galvanized locknuts, and insulated bushings, care being observed to see that the full number of threads project through to permit the bushing to be drawn tight against the end of conduit, after the locknuts shall have been made up sufficiently tight to draw them into firm electrical contact with the box.

3.3.2.7 During installation, conduit ends shall be capped or plugged to prevent the entrance of foreign matter. Necessary precautions to prevent accumulation of water, dirt, or concrete in the conduits during construction shall be taken. Conduits in which water or other foreign materials have been permitted to accumulate shall be cleaned thoroughly or the conduit run replaced where such accumulation cannot be removed by methods approved by the Owner.

3.3.2.8 Where more than one device is installed at the same location and mounting height, a gangplate shall be used.

3.3.2.9 Junction and/or pull boxes shall be furnished and installed where necessary to avoid excessive runs or too many bends between outlets.

3.3.2.10 Duplex convenience outlets shall be set vertically to centerline of boxes 24 inches above the floor unless otherwise indicated on drawings. Mount outlet so the ground plug is on the top.

3.3.2.11 Switches shall be flush mounted 46 inches above floor and white nylon covers provided.

3.4 INSTALLATION OF CONDUCTORS

3.4.1 No wires shall be installed until work which might cause damage to the wires or conduits has been completed. Conductors terminating at wired outlets shall extend at least 12 inches beyond the outlet to facilitate installation of wiring devices or fixtures.

3.4.2 Control conductors and power conductors shall be continuous from outlet to outlet. No control or power conductors shall be spliced.

3.4.3 Splices in lighting conductors shall be made with splicing caps with metal inserts only such as 3M Company "Scotchlocks" splicing connectors. Connectors shall have Underwriter's Laboratory approval for use at 600 volts. Lighting conductors No. 10 and smaller may be joined by Ideal "Wirenuts" if visible in outlet or junction boxes.

3.4.4 Approved lubricants shall be used to facilitate pulling conductors into conduit.

3.4.5 The following color code shall be used for all conductors in feeder and branch circuits.

120/208

Phase A - Black	Phase B - Red
Phase C - Blue	Neutral - White
Ground - Green	

Branch circuit conductors shall be factory color coded. Scotch tape of the proper color may be used to identify conductors No. 4 and larger. All feeders, subfeeders to panels, motor starters, and motors shall be completely phased out as to sequences and rotation. Phase sequence shall be A-B-C from front to rear, top to bottom, or left to right when facing equipment.

END OF SECTION 16101

SECTION 16440 - PANELBOARDS

PART 1 - GENERAL

1.1 **SUMMARY**:

1.1.1 Provide all labor, materials, and equipment necessary to furnish and properly install branch circuit and distribution panelboards as scheduled on the drawings.

1.2 **RELATED WORK SPECIFIED ELSEWHERE**:

1.2.1 Additional work and requirements related to this section may be found in, but not limited to, the following section:

1.2.1.1 16000 - General Provision Electrical System

1.3 **SUBMITTALS**:

1.3.1 Submit shop drawings and equipment data sheets showing manufacturer's listing on each panelboard including, but not limited to, number, size, AIC rating, location of circuit breakers, type of enclosure and door.

1.4 **DELIVERY, STORAGE, AND HANDLING**:

1.4.1 Deliver and store in original factory packaging bearing the manufacturer's label intact. Protect by storing in an indoor location until construction installation.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**:

2.1.1 Acceptable manufacturers shall be Square D, General Electric, or Siemens.

2.2 **BUSSING**:

2.2.1 Bussing shall be copper with all current carrying parts plated. Bussing shall be full height without reduction with a phase sequence type tap arrangement permitting a two or three pole circuit breaker to be installed in any location.

2.3 **NEUTRAL BUS**:

2.3.1 Bus shall be full size with an appropriate lug for each out-going circuit (which requires a neutral connection).

2.4 **GROUND BUS**:

2.4.1 The ground bus shall also be provided with an appropriate lug for each out-going circuit.

2.5 **LUGS**:

2.5.1 Lugs for the incoming feeder (or feed-through capability when denoted on the drawings) shall be set-screw type sized for the conductors shown on the drawings and bolted directly to the bus. Provide multiple lugs for parallel incoming feeders. All lugs shall be rated for 75 degrees Centigrade.

2.6 **INTERIOR**:

2.6.1 Interior shall be factory assembled with switching and protective devices, wire connectors, etc., arranged in double row construction. The design of the interior shall permit the replacement of switching and protective devices without disturbing adjacent units and without removing the main bus connectors. The design shall also permit the changing of circuits without machining, drilling, or tapping bussing.

2.7 **FUTURE SPACES**:

2.7.1 Spaces shall be fully bussed, complete with all necessary mounting hardware (less the future circuit breaker unless otherwise noted), and located as shown on the panel schedule.

2.8 **DOORS**:

2.8.1 Doors shall cover all device handles and shall have a directory holder with clear plastic plate and metal frame on the inside surfaces of the door.

2.9 **HINGES**:

2.9.1 Hinges shall be concealed, 5-knuckle, steel construction.

2.10 **LATCHES**:

2.10.1 Latches shall be spring loaded flush types, not protruding beyond the front of the door. Locks shall be flush, 5-pin cylinder types, all keyed alike.

2.11 **CIRCUIT BREAKERS**:

2.11.1 Breakers shall be thermal-magnetic, molded case, bolt-on types, with permanent inverse time-current overload and instantaneous magnetic tripping unit, unless otherwise shown. Thermal elements shall be calibrated for 40 degrees Centigrade or shall be ambient-compensating.

2.11.1.1 Quick-make, quick-break, with tripped indication clearly shown by breaker handle taking a position between ON and OFF.

2.11.1.2 Multi-pole breakers shall have a common internal trip. No handle ties between single pole breakers.

2.12 **MAIN CIRCUIT BREAKERS**:

2.12.1 Where required, breaker shall be individually mounted separate from all branch breakers yet part of the same enclosure.

2.12.1.1 The main circuit breaker shall be covered by a metal plate, except for operating its handle.

2.12.1.2 Connection from the load side of the circuit breaker to the panelboard bussing shall be by bus bar only (conductor connection shall not be permitted).

2.13 **TERMINALS**:

2.13.1 All circuit breaker terminals (both main and branch) shall be rated for 75 degrees Centigrade.

2.14 **RATINGS**:

2.14.1 The bus size, voltage rating and configuration, main rating, number of circuits, and AIC rating of each panelboard assembly shall be as indicated on the drawings. No series ratings shall be acceptable.

PART 3 - EXECUTION

3.1 **INSTALLATION**:

3.1.1 Install all panelboards in accordance with the manufacturer's written instructions, NEMA's "Standard of Installation", the applicable requirements of the National Electrical Code, and recognized industry practice.

3.1.1.1 Provide proper working clearances at every panelboard. The working space in front of a panelboard shall be as a minimum, 30 inches wide extending 3 feet out perpendicular to the panelboard per section 110 of the NEC.

3.1.1.2 Enclosures shall be installed so that the top is no higher than 6'-6" above finished floor. Where the size of the enclosure is such that the top cannot be installed at 6'-6", the top of the enclosure shall be kept as low as possible.

3.2 **CLEAN THE INTERIOR** of each panelboard before installing conductors. At all times, keep the interior trim and exterior surfaces of the panelboard free of paint and other debris. Repaint finishes, if damaged during construction.

3.3 **COORDINATION**:

3.3.1 Route all conductors within their respective panelboards so that all connections and conductor routing present a neat, orderly appearance. Conductors in the panelboards shall be laced and arranged in an orderly manner.

3.4 **CIRCUIT DIRECTORY CARDS**:

3.4.1 Cards shall be accurate and neatly typed.

3.5 **ENERGIZATION AND TESTING**:

3.5.1 After installation, apply electrical power and demonstrate proper phase and voltage at each circuit breaker.

3.5.1.1 All single phase loads in three phase panelboards shall be balanced using a clamp-on ammeter with at least 3% accuracy to achieve nominal loading (within 10 percent) among phases. Update panelboard directories to reflect changes made.

3.5.1.2 Verify proper terminations, grounding, and correct conductor polarity.

3.5.1.3 Verify all circuit breakers are connected to the respective load indicated in the directory by visually checking for power loss.

3.5.1.4 Performance test all ground fault and shunt trip circuit breakers.

3.5.1.5 Correct any deficiencies and retest for compliance.

3.6 **FINAL ACCEPTANCE**:

3.6.1 All panelboards shall be thoroughly cleaned, properly labeled, and operating satisfactorily prior to final acceptance. Provide operation and maintenance information as part of O & M manual requirements.

END OF SECTION 16440

SECTION 16452 - GROUNDING

PART 1 - GENERAL

1.1 **SUMMARY**: Provide all labor, materials, and equipment necessary to furnish and properly install a grounding system which shall be in full compliance with all applicable codes and required by the local authority having jurisdiction.

1.2 **RELATED WORK SPECIFIED ELSEWHERE**: Additional work and requirements related to this section may be found in, but not limited to the following sections:

1.2.1 Section 16440 - Panelboards

1.3 **SUBMITTALS**: Submit catalog information for all devices, rods, connectors, etc.

1.4 **DELIVERY, STORAGE AND HANDLING**: Deliver and store in original factory container bearing manufacturer's label intact. Protect by storing in an indoor location.

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**: Acceptable manufacturers of grounding connectors and clamps shall be Penn Union, Burndy, or Thomas and Betts.

2.2 **GROUNDING CONDUCTORS**: Service and equipment grounding conductors, and bonding jumpers shall be insulated copper, Type THHN or THWN conductors (unless noted otherwise) and shall be sized in accordance with the applicable portions of Article 250 of the National Electrical Code.

2.3 **CONNECTIONS**:

2.3.1 All ground connections that are buried or in other inaccessible locations, shall be welded exothermically. The weld shall provide a connection which shall not corrode or loosen and which shall be equal or larger in size than the conductors joined together. The connection shall have the same current carrying capacity as the largest conductor.

2.4 **GROUNDING CONNECTORS**: Connectors shall comply with UL 467 and be UL listed for use with rods, conductors, reinforcing bars, etc., as appropriate.

2.5 **GROUND RODS**: Rods shall be copper clad steel rods 3/4 inch in diameter and 8 feet long unless noted otherwise. Rods shall be sectional type with cone shaped point, and die stamped near top with the name or trademark of the manufacturer and the length of rod in feet.

PART 3 - EXECUTION

3.1 **GENERAL**: All circuits shall contain a service or equipment grounding conductor even if not shown on the drawings as listed in these specifications.

3.2 **INSTALLATION:** Install ground bushings on all conduits entering enclosures where the continuity of grounding is broken between the conduit and enclosure. Provide an appropriately sized bond jumper from the ground bushing to the equipment ground bus.

3.3 **SERVICE GROUNDING**: The bonding ground connection between the building's metal and the conduit system shall occur at the main service overcurrent protection device.

3.3.1 Where available on the premises, bond the following items together:

3.3.1.1 Metal water pipe Telephone service entrance

3.3.1.2 Building metal frame Cable TV service entrance

3.3.2 Bonding of the electrical system to the metal water pipe shall occur only at the main entry point of the water pipe into the building and only on the supply side of the main shutoff valve. Also, provide a bond jumper around the water meter.

3.4 **OUTLET GROUNDING**: All receptacles shall be grounded by connection to the equipment grounding conductor which shall be run with the circuit conductors. Isolated ground type receptacles, the outlet box shall be connected to the equipment grounding conductor and the receptacle, itself, shall be connected to the isolated equipment grounding conductor.

3.5 **ENERGIZATION AND TESTING**: The entire grounding system shall be checked for continuity and a low impedance to ground. Service entrance grounding shall meet the testing criteria given under the appropriate equipment specification section of these specifications.

3.6 **FINAL ACCEPTANCE**: The grounding system shall satisfactorily meet all testing criteria before final acceptance.

END OF SECTION 16452

SECTION 16510 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 **SUMMARY:** Furnish all labor, materials, and equipment necessary to furnish and properly install all interior and exterior lighting fixtures.

1.2 **RELATED WORK SPECIFIED ELSEWHERE:**

1.2.1 Additional work and requirements related to this section may be found in, but not limited to, the following sections:

01010 - Summary of Work
16000 - General Provision Electrical System

1.3 **DELIVERY, STORAGE, AND HANDLING:**

1.3.1 Deliver to site in original sealed containers bearing manufacturer's name and catalog number.

1.3.2 Protect by storing in an indoor location.

1.3.3 Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Damaged and/or broken fixtures shall be replaced at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 **COORDINATION:**

2.1.1 The electrical contractor shall fully coordinate all fixture types with the finish schedule and reflected ceiling plans furnished to the General Contractor prior to installing fixtures. Any conflict shall be identified to the Owner and General Contractor for subsequent restoration by the Owner.

2.2 **LIGHTING FIXTURES:**

2.2.1 Refer to the "Lighting Fixture Schedule" on the drawings for the size and type of fixtures required. Fixtures listed within the schedule are subject to change by specification items within this Section or by note on the drawings. The Contractor shall be responsible for verifying catalog numbers as necessary to obtain all necessary mounting accessories and features.

2.2.2 Catalog numbers are for general identification of fixture only. All related parts, such as plaster rings, junction boxes, louvers, shields, mounting stems, flange kits, canopies, connectors, straps, nipples, etc., to fit them properly to the construction, shall be furnished and installed by the Contractor.

2.2.3 Fixtures which shall be recessed into plaster or gypsum board ceilings shall be suitable for such installations and shall be furnished complete with all necessary mounting accessories. Where required, fixtures shall be provided with adjustable brackets which shall fit over ceiling support channels.

2.2.4 All fixtures shall be UL listed and labeled. Fixtures shown to be installed in a wet or damp location shall be UL listed and appropriately labeled for the respective area. The UL label shall be permanently attached to the fixture frame, housing, or other nonrenewable part.

2.2.5 Recessed fixtures, including those installed in grid ceiling systems shall be provided with thermal protection. Incandescent fixtures shall comply with Article 410-65 (NEC 70) and be appropriately labeled.

2.2.6 Recessed fixtures in other than "lay-in" grid ceiling systems shall be prewired types with an UL wiring junction box.

2.3 **LAMPS:**

2.3.1 Lamps shall be supplied for each respective fixture and shall comply with the manufacturer's recommendations, the Light Fixture Schedule, and as noted in these specifications. Manufacturers shall be limited to General Electric, Phillips, and Sylvania, unless specifically approved by the Engineer.

2.3.2 Lamp types shall be as specified in "Light Fixture Schedule".

2.4 **LENS:**

2.4.1 Provide lenses for lay-in fluorescent fixtures as indicated on Light Fixture Schedule. All acrylic prismatic lenses for 1 X 4 and 2 X 4 fixtures shall have a thickness of 0.125 inches minimum, 0.140 inches, nominal.

PART 3 - EXECUTION

3.1 Refer to reflected ceiling plans for exact locations of fixtures.

3.2 **INSTALLATION:**

3.2.1 Install all light fixtures in accordance with the manufacturer's written instructions, NECA's "Standards of Installation," the applicable requirements of NEMA and the National Electrical Code, and recognized industry practices.

3.2.2 Install interior lighting fixtures where shown and at the indicated heights.

3.2.3 Fasten fixtures securely to the structural support members of the building and check to ensure that solid pendant fixtures are plumb.

3.2.4 Recessed type (lay-in) LED fixtures shall have 6'-0" of flexible conduit installed from junction box to fixture housing so fixture can be relocated in room as required.

3.2.5 Recessed LED fixtures shall be installed as required by N.E.C. using a piece of flexible conduit, anti-short bushing, and type AF wire between outlet box and fixture, unless unit is UL approved as a type with built-on junction box to receive circuit wiring. The Contractor shall determine type construction of the fixtures he proposes to use and install them correctly. Mount square and with flanges tight to ceiling.

3.3 **SUPPORT:**

3.3.1 In addition to the requirements of Articles 410-15 and 410-16, (NFPA 70), all fixtures shall be securely supported as follows:

3.3.2 Provide swivel hangers (for a plumb installation) for all pendant fixtures, unless noted otherwise on the drawings.

3.3.3 For industrial types, provide chain yoke suspension.

3.3.4 For continuous rows of suspended LED fixtures, provide not less than one #12 gauge (0.106"), galvanized suspension wire per side per fixture over the entire length of the row as well as the wiring stem at one end. Continuous runs of fixtures shall be bolted end to end to assure uniform alignment.

3.4 **ENERGIZATION AND TESTING:**

3.4.1 After installation, apply electrical power and demonstrate proper voltage phase and light level at each fixture.

3.4.2 Verify proper terminations, grounding, and conductor polarity.

3.4.3 Operate all test push buttons on emergency egress light fixtures and exit signs to demonstrate transfer to emergency battery. For fixtures served by emergency generator, start the generator, transfer, and verify all emergency egress light fixtures and exit signs are illuminated.

3.3.3 Correct all deficiencies and retest for compliance.

3.5 **FINAL ACCEPTANCE**:

3.5.1 All light fixtures shall be properly installed and operating satisfactorily prior to final acceptance.

3.5.2 At the time of acceptance, clean all fixtures, remove all tape and shipping labels, and touch up all blemishes. Also, replace lamps in lighting fixtures which are noticeably dimmed, as judged by the Engineer.

3.5.3 The Contractor shall furnish to the Owner extra lamps prepackaged for storage. The amount supplied shall be five percent (no less than none item and no more than fifty items for each lamp type provided as part of the contract.

3.5.4 Provide operation and maintenance information as part of O & M manual requirements.

END OF SECTION 16510

SECTION 16720 - TELEPHONE AND CATV SYSTEMS

PART 1 - GENERAL

1.1 **SUMMARY**:

1.1.1 Provide all labor, materials, and equipment to furnish and properly install all raceways, mounting boards wiring, and outlets for CATV and telephone service as shown on the drawings.

1.2 **RELATED WORK SPECIFIED ELSEWHERE**:

1.2.1 Additional work and requirements related to this section may be found in, but not limited to, the following sections:

1.3 Submittals, delivery, storage, and handling of materials shall comply with the requirements stated in related sections of these specifications.

PART 2 - PRODUCTS

2.1 **REFER TO** related sections for specific materials and product requirements.

2.2 **WALL OUTLET** (boxes) shall be the same as for receptacles.

2.3 **WALL PLATES** shall be white color, plastic types with 7/16" core opening unless otherwise noted.

2.3.1 Telephone wall jack shall be Hubbell #PJ216W.

2.3.2 Cable TV wall jack shall be Hubbell #PJ212W.

2.4 **BACKBOARDS** shall be 4' X 4' X 3/4" thick plywood painted on all sides and edges with 2 coats of fire retardant paint unless otherwise noted.

2.5 **TELEPHONE CABLE** shall be 24 gauge, copper, four twisted pairs inside PVC jacket. Coleman Cat 5E, 350MHz, 24/8 twisted pair cable or other manufacturer approved by Owner and Architect/Engineer.

2.6 Cable television cable shall be RG6 18 AWG cable, Commonscope R97-00-62 or equal.

PART 3 - EXECUTION

3.1 **GENERAL**:

3.1.1 Outlets are shown on the drawings in their approximate locations. Coordinate exact locations with the Owner prior to rough-in. Provide all telephone wiring to the backboards.

3.1.2 Where required by local utility companies, shall be in accordance with established standards and shall be inspected and approved.

3.2 **INSTALLATION**:

3.2.1 Refer to related sections for installation of empty raceways and outlets.

3.2.1 Cap unused service entrance conduits for future use.

3.2.2 Seal penetrations between floors and through rated walls after cables are installed.

3.2.3 Label all communication wiring per room number and name according to signage plan – see “I” drawings.

3.3 **TESTING**:

3.3.1 Refer to related sections for testing requirements.

3.4 **FINAL ACCEPTANCE**:

3.4.1 All work must be neat, orderly, and properly installed prior to final inspection.

END OF SECTION 16720