BLUE GRASS AIRPORT
LEXINGTON, KENTUCKY

FINAL CONSTRUCTION DOCUMENTS

BID PACKAGE
AND
CONTRACT DOCUMENTS
FOR
BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION

October 20, 2017

NON-FAA FUNDED CONSTRUCTION BID PACKAGE
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BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SEALED BIDS for BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION and other incidental items will be received by the LEXINGTON-FAYETTE URBAN COUNTY AIRPORT BOARD (hereinafter referred to as “LFUCAB”) in the Director of Planning and Development’s Office until and not later than 2:00 P.M. Local Time on the sixteenth day of November 2017, at which time the Bids will be publicly opened and read aloud at Blue Grass Airport, Board Office.

THE PROJECT consists of 2,000 square foot General Aviation Facility renovation of an existing customs facility inside an existing storage / shipping building and other Work indicated in the Contract Documents.

BIDDERS must be in good standing with the Commonwealth of Kentucky and be qualified to meet all Local, State and Federal statutes, codes, regulations and ordinances governing the performance of the type of work for which Bidder is submitting a Bid.

THE CONTRACT DOCUMENTS (Drawings, Specifications, Proposal Forms, etc.) may be purchased at lynnimaging.com or examined at the following:

Lynn Imaging Reprographics
328 Old Vine St.
Lexington, KY 40507

Sherman Carter Barnhart Architects, PLLC
2405 Harrodsburg Road
Lexington, KY 40504

Engineering Office
Blue Grass Airport
4000 Terminal Drive, Suite 206
Lexington, KY 40510

Successful Bidders shall be required to pay at least prevailing wage rates established by the Kentucky Department of Labor.

BID GUARANTY. Each sealed Bid shall be accompanied by an irrevocable Bank Letter of Credit, or a Bid Bond satisfactory to LFUCAB with good corporate surety, in a sum not less than ten (10%) percent of the aggregate amount of the Bid, payable without condition to the LFUCAB, to guarantee that if the Bidder’s offer results in an Award, that the Bidder will furnish all required bonds, insurance certificate(s) and insurance policy(ies) within fourteen (14) Calendar Days after the Notice of Award is given, and enter into the Contract.
A PRE-BID CONFERENCE will be conducted on November 2, 2017, 1:00 p.m. local time in the Airport Board Room, Second Floor, Terminal Building, Blue Grass Airport.

DBE POLICY. The LFUCAB shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of the Contract, or in the administration of its Disadvantaged Business Enterprise Program (“DBE Program”) or the requirements of 49 CFR Part 26. LFUCAB shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure non-discrimination in the award and administration of DOT-assisted contracts, the LFUCAB’s DBE Program, as required by 49 CFR Part 26 and as approved by DOT, is incorporated by reference. Implementation of this DBE program is a legal obligation and failure to carry out its terms shall be treated as a violation of any agreement executed with LFUCAB. Upon notification to LFUCAB of its failure to carry out its approved DBE Program, the DOT may impose sanctions as provided for under Part 26 and may, in appropriate cases, refer this matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 et seq.)

DBE REQUIREMENTS. The LFUCAB has established a Contract goal of a minimum of zero (0) percent of the work to be performed by a certified Disadvantaged Business Enterprise (DBE). The DBE participation percentages submitted will be a material representation upon which the LFUCAB is relying in making an evaluation for award of this Contract. Bidders are advised that meeting DBE subcontract goals or making an acceptable good faith effort to meet such goals are conditions of being awarded this Contract.

The LFUCAB proposes to award the Contract to the lowest responsive and responsible Bidder, provided it has met the goals for DBE participation or, if failing to meet the goals, has made an acceptable good faith effort to meet the established goals for the DBE participation. Bidder is advised that LFUCAB reserves the right to reject any and all Bids submitted, to waive any and all informalities, irregularities and/or technicalities in any Bid or Bid Guaranty, to accept any Bid deemed advantageous to it; and, to negotiate changes, deletions, or additions to these Contract Documents with the successful Bidder.

BIDDERS’ attention is directed to the requirement that a minimum of twenty-five percent the Work (i.e. 25 percent of the total aggregate dollar amount) covered under this Project shall be done by personnel directly in full-time employment status of the Bidder. This will remain a requirement throughout the life of the Contract.

TITLE VI SOLICITATION NOTICE. LFUCAB, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all Bidders that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprise will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.
Bids must be submitted on the standard form of Bid Proposal, and the successful BIDDER will be required to execute the Standard Form of Contract Agreement.

LEXINGTON-FAYETTE URBAN
COUNTY AIRPORT BOARD

Director of Engineering and Maintenance
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 10 - DEFINITIONS OF TERMS

Whenever the following terms are used in the General Conditions, the Special Conditions, the Specifications, in any of the Contract Documents or other instruments or attachments pertaining to construction, the intent and meaning shall be interpreted as follows:

10.1 **AASHTO.** The American Association of State Highway and Transportation Officials, the successor association to AASHO.

10.2 **ACCESS ROAD.** The right of way, the roadway and all improvements constructed thereon connecting the Airport to a public highway or roadway.

10.3 **ACCIDENT OR OCCURRENCE.** An unforeseen and unintended event or sudden happening, including any repeated exposure to conditions with result in injury to people or property damage.

10.4 **ADVERTISEMENTS.** A public announcement, as required by Kentucky law, inviting bids for work to be performed and materials to be furnished.

10.5 **AIR OPERATIONS AREA.** For the purpose of these Contract Documents, the term air operations shall mean any area of the Airport used or intended to be used for the landing, takeoff, or surface maneuvering or aircraft. An Air Operation Area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxi, or apron.

10.6 **AIRPORT.** Airport means any and all property and improvements owned, leased or controlled by LFUCAB, which shall mean the Blue Grass Airport, Lexington, Kentucky.

10.7 **ASTM.** The American Society for Testing and Materials.

10.8 **AWARD.** The acceptance, by the Owner, LFUCAB, of the successful Bidder’s proposal.

10.9 **AWARDED CONTRACT.** The Contract and Contract Documents as they exist on the first date of signing by LFUCAB and the Contractor.

10.10 **APRON.** Apron means the portion of the Air Operators Area of the Airport that has been designated by the Authority for movement and parking of aircraft, but does not include Runways or Taxiways.
10.11 BIDDER. Any individual, partnership, firm, limited liability company or corporation, acting directly or through a duly authorized representative, who submits a proposal for the Work contemplated.

10.12 BANK LETTER OF CREDIT. The irrevocable letter of credit issued by a commercial bank acceptable to LFUCAB, in a form acceptable to LFUCAB in its sole discretion drawable at a financial institution located in Lexington, Kentucky, and having an expiration date not prior to 90 days following the Bid Opening Date. Bidder is encouraged to use a Disadvantaged Financial Institution with respect to its Letter of Credit.

10.13 BID. The written offer of the Bidder (submitted on the attached Bid Form) to perform the Work and provide the necessary materials and Equipment in accordance with the Contract Documents.

10.14 BID GUARANTY. The security transferred with the Bid to guarantee that the Bidder will enter into a Contract with LFUCAB if awarded the Contract.

10.15 BID PACKAGE. All the documents of any kind or nature furnished by LFUCAB or available to the Bidders prior to the Opening of the Bids for this Project.

10.16 BUILDING AREA. An area of the Airport to be used, considered, or intended to be used for Airport buildings or other Airport facilities or rights-or-ways together with all Airport buildings and facilities located thereon.

10.17 CALENDAR DAY OR DAYS. Every day shown on the calendar.

10.18 CHANGE ORDER. A written order to the Contractor covering changes in the Plans, Specifications, or proposal quantities and establishing the basis of payment and/or Contract Time adjustment, if any, for Work affected by such changes. The Work, covered by the Change Order, shall be within the scope of the Contract.

10.19 CONTRACT DOCUMENTS. Contract Documents shall include the Bid Package, Bid, Contract Agreement (including all addenda and/or change orders), Performance Bond, Payment Bond, Certificates of Insurance, Supplemental Agreements, General Conditions, Technical Specifications, Special Conditions, Plans, Drawings and Attachments.

10.20 CONTRACT ITEM (PAY ITEM). A specific unit of work for which a price is provided in the Contract or Proposal.

10.21 CONTRACT PRICE. The dollar amount Bid by the Contractor, as the same may be adjusted pursuant to the provisions of the Contract Documents, for which sum Contractor has agreed to complete the Project and all Work associated therewith.

10.22 CONTRACT TIME. The number of Calendar Days or working days, as stated in the Bid, allowed for completion of the Contract Documents, including authorized time extensions. If a specific date of completion is stated in the Bid or Contract in lieu of a number of Calendar or
working Days, the Contract shall be substantially completed by this date. Time limits as stated in the Contract Documents are the essence of the Contract.

10.23 **CONTRACT WORK.** That work prescribed by the Contract Documents.

10.24 **CONTRACTOR.** The individual, partnership, firm, limited liability company or corporation primarily liable for the acceptable performance of the Contract Work and who is responsible for the payment of all legal debts pertaining to the Work, and who acts directly or through lawful agents or employees to complete the Contract Work.

10.25 **CONSTRUCTION AGREEMENT.** The written agreement covering the obligations to be performed by both LFUCAB and the contractor, including any and all addenda, change orders, and any other written modifications, or alterations.

10.26 **DRAINAGE SYSTEM.** The system of pipes, ditches, and structures by which surface or subsurface water are collected and conducted from the Airport area.

10.27 **ENGINEER.** The individual, partnership, firm, limited liability company or corporation under contract with LFUCAB, to be responsible for the engineering supervision of the Contract Work and acting directly or through an authorized representative. The Engineer shall have the authority to stop any Work on the Project in order to insure the proper execution of such Work in accordance with the Contract Documents. The Engineer shall also have the authority to reject any and all Work or materials which does not conform to the Contract Documents and to direct the application of labor and materials to any part of the Project which in the Engineer’s sole judgment is necessary or required. Neither the Engineer nor the LFUCAB shall be liable to the Contractor for failure to make any inspection permitted by the Contract Documents, and it shall be the duty of the Contractor to carry out the Project in conformance with the Contract Documents in the absence of any such inspectors. The Engineer shall be the interpreter of the Plans and Specifications and will be the judge of the Contractor's performance under the Contract Documents, will determine the rights of Other Contractors or Subcontractors, and shall decide any other questions which may arise during the execution of the Project.

10.28 **EQUIPMENT.** All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the Work.

10.29 **EXTRA WORK.** Any item of Work not provided for in the Awarded Contract as modified by a Change Order or Supplemental Agreement, but which is found by the Engineer to be necessary to complete the Work within the limited scope of the Project.

10.30 **FAA.** The Federal Aviation Administration of the U.S. Department of Transportation. When used to designate a person, FAA shall mean Administrator or his/her duly authorized representative.

10.31 **FEDERAL SPECIFICATIONS.** The Federal Specifications and Standards, and supplements, amendments, and indices thereto are prepared and issued by the General Services
Administration of the Federal Government. They may be obtained from the Specifications Activity, Printed Materials Supply Division, Building 197, Naval Weapons Plant, Washington, D.C. 20407.

10.32 **FINAL ACCEPTANCE.** Final Acceptance shall occur in accordance with these Contract Documents and shall occur only when all of the Work has been fully and finally performed as required by the Contract Documents, and have been inspected and so certified by the Engineer.

10.33 **INSPECTOR.** An authorized representative of the Engineer assigned to make all necessary inspections and/or tests of the Work performed or being performed, or of the materials furnished or being furnished by the Contractor. Inspector is not authorized to make changes in the Specifications.

10.34 **INTENTION OF TERMS.** Whenever used in the Contract Documents, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of the like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the engineer is intended; and similarly, the words “approved,” “acceptable,” “satisfactory,” or words of like import, shall mean approved by, accepted by, or satisfactory to the Engineer, subject in any case to the final determination of the LFUCAB.

Any reference to a specific requirement of a numbered paragraph of the Contract provisions or a cited standard shall be interpreted to include all general requirements of the entire section, specification items, or cited standard that may be pertinent to such specific reference.

Words in the singular or plural, masculine or feminine, present, past, or future tense shall be read as to conform or to give effective meaning to the spirit or intent of the Contract Documents.

10.35 **LABORATORY.** The official testing laboratories of the Contractor or other such laboratories as may be designated by the Engineer.

10.36 **LIGHTING.** A system of fixtures providing or controlling the light sources used on or near the Airport to within the Airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the Airport or to aid in the operation or aircraft landing at, taking off from, or taxiing on the Airport surface.

10.37 **LIQUIDATED DAMAGES.** As the parties recognize that the damages LFUCAB will suffer due to delayed completion by the Contractor are difficult to calculate, the parties have agreed to liquidate the amount due to be paid by the Contractor to LFUCAB in the event of delays caused by Contractor. Therefore, the parties have agreed in the Contract Documents that Liquidated Damages will be assessed on a per diem basis in an amount set forth in these Contract Documents, and shall not be construed to be a penalty.

10.38 **MAJOR AND MINOR CONTRACT ITEMS.** A Major Contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 10% of the total amount of the Awarded Contract. All other items shall be considered minor contract items.
10.39 **MATERIALS.** Any substance or supplies specified for use in the construction of the Contract Work.

10.40 **MOVEMENT/NON-MOVEMENT AREAS.** Movement Areas are those areas covered by Air Traffic Control. Non-Movement Areas are those areas of the Airport Operations Area that are not covered by Air Traffic Control.

10.41 **NOTICE OF AWARD.** Written notice to the successful Bidder that its Bid has been accepted by LFUCAB, subject to all of the terms and conditions and limitations of the Contract Documents.

10.42 **NOTICE TO PROCEED.** A Written Notice to the successful Bidder to begin the Work on the Contract. If applicable, the Notice to Proceed shall state the date on which the Contract Time begins.

10.43 **OWNER.** The Owner is the person or organization identified as such in the Construction Contract. The Owner is Lexington Fayette Urban County Airport Board, which is also referred to as “LFUCAB.”

10.44 **OR EQUAL.** Whenever the words “or equal” appear in the Contract Documents, they shall be interpreted to mean an item of Material or Equipment equal in quality to that named in the Contract Documents and which is suited to the same use, and capable of performing the same function with at least equivalent efficiency, as that named. Inclusion of “or equal” Material or Equipment in the Contractor’s Bid shall not obligate the LFUCAB to accept such Material or Equipment if, in the Engineer’s sole opinion, it does not meet or exceed the requirements of the Contract Documents and purposes of the Specifications. It is not required that the Engineer prove that the alternate proposed by the Contractor as being equal does not meet the Specifications, but the burden of proof of equal quality or service shall be the responsibility of the Contractor. Any dispute as to equality shall be determined solely by the Engineer whose decision in such matters shall be final.

10.45 **PAVEMENT.** The combined surface course, base course, and subbase course, if any, considered as a single unit.

10.46 **PAYMENT BOND.** The approved form of security furnished by the Contractor and its surety as a guaranty that it will pay in full, subject to the terms of the Contract Documents, all bills and accounts for materials, supplies, rentals furnished and labor used in the construction of the Work, including Kentucky Unemployment Insurance contributions as provided in KRS 341.317.

10.47 **PERFORMANCE BOND.** The approved form of security furnished by the Contractor and the Surety as a guarantee that the Contractor will complete the Work in accordance with the terms of the Contract Documents.
10.48 **PLANS.** The official drawings or exact reproductions approved by the Engineer, which show the location, character, dimensions, and details of the work to be done and which are to be considered part of the Contract Documents.

10.49 **PROGRESS SCHEDULE.** The Progress Schedule shall relate to the entire Project or as may be required by the Contract Documents. It shall be the document that describes the starting, interfacing, and completion of the various stages of construction and the starting and completion dates of each trade or subcontractor performing work on the Contract. The schedule will be in the form required by the Contract Documents.

10.50 **PROJECT.** The Project is the agreed Scope of Work for the completion of the Work to be performed as set forth in these Contract Documents.

10.51 **RUNWAY.** The area on the Airport prepared for landing and takeoff of the aircraft.

10.52 **SAMPLES.** The physical examples or specimens which illustrate materials, equipment or workmanship or provide specimens or establish standards by which the Work will be judged.

10.53 **SHOP DRAWINGS.** The drawings, diagrams, schedules or other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

10.54 **SPECIFICATIONS.** A part of the Contract Documents containing the written directions and requirements for completing the Contract Work. Standards for specifying materials or testing which are cited and incorporated in the Contract Specifications by reference, and shall have the same force and effect as if included in the Contract physically.

10.55 **SECURED AREAS.** The Contractor may be assigned certain secured areas or given access to security or restricted areas, and which areas would otherwise not be accessible to the Contractor, its employees, or its subcontractor or its employees.

10.56 **STRUCTURES.** Airport improvements including, but not limited to bridges; culverts; catch basins; inlets, retaining walls; cribbing; storm and sanctuary sewer lines; water lines; underdrains; electrical ducts; manholes; handholes; lighting fixtures and base; transformers; flexible and rigid pavements; navigational aids; buildings; vaults; and other man-made features of the Airport that may be encountered in the work and not classified herein.

10.57 **SUBCONTRACTOR.** A person or entity having a direct contract or agreement with the Contractor, or another Subcontractor to perform or supply any of the Work.

10.58 **SUBGRADE.** The soil which forms the pavement foundation.

10.59 **SUBSTANTIAL COMPLETION.** Substantial Completion shall be certified by the Engineer to have occurred when construction is sufficiently complete, in accordance with Section 50.16 of the Contract Documents, so that the Owner may occupy and enjoy the beneficial use of the Work or a designated portion thereof.
10.60 **SUPERINTENDENT.** The Contractor’s executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Engineer and who shall supervise and direct the construction and who must be present a majority of the time Work is progressing on the project site.

10.61 **SUPPLEMENTAL AGREEMENT.** A written agreement between the Contractor and the Owner covering (1) Work that is a Major Contract Item which would increase or decrease the total dollar amount of the Awarded Contract Price by more than 25%, such increased or decreased Work being within the scope of the originally awarded Contract; or (2) any Work that is not within the scope of the originally awarded Contract which will increase or decrease the total dollar amount of the Work by more than 25%.

10.62 **SURETY.** The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds which have been furnished to the Owner by the Contractor. Surety must be authorized to do business in Kentucky.

10.63 **TAXIWAY.** The term taxiway means the portion of the air operations areas of an airport that have been designated by competent Airport authority for movement of aircraft to and from the Airport’s runways or aircraft parking areas.

10.64 **UNIT PRICE.** The price specified by the successful Bidder (Contractor) in the Bid Schedule of the Bid Form for which each Work item will be performed or each material item will be furnished in order to complete the Project in accordance with the Contract Documents.

10.65 **WRITTEN NOTICE.** All notices required by the Contract Documents shall be in writing and shall be sufficient, and shall be deemed delivered, if hand delivered, or sent by certified mail, postage prepaid, by one party to the other, at such receiving party’s principal place of business or the last business address known to the party giving notice.

10.66 **WORK.** The furnishing of all labor, Materials, tools, Equipment, and incidentals necessary to the Contractor’s performance of all duties and obligations imposed by the Contract Documents, including, without limitation, all of Contractor’s warranty obligations, express or implied.

10.67 **WORKING DAY.** A Working Day shall be any day other than a legal holiday, Saturday or Sunday on which the normal working forces of the Contractor may proceed with the regular work for at least six hours toward the completion of the contract. Unless Work is suspended for causes beyond the Contractor’s control, Saturdays, Sundays, and holidays on which the Contractor’s forces engage in regular work, requiring the presence of an inspector, will be considered working days.

**END OF SECTION 10**
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 20 - BID REQUIREMENTS AND CONDITIONS

20.1 ADVERTISEMENT (Notice to Bidders). LFUCAB, or its authorized agent, shall publish the advertisement at such places and at such times as are required by law. The published advertisement shall state the time and place for submitting sealed Bids; a description of the proposed work; instructions to Bidders as to obtaining Bid forms, Plans, and Specifications, Bid guaranty be required; and LFUCAB’s right to reject any and all Bids.

20.2 PREQUALIFICATION OF BIDDERS. Each Bidder shall furnish to LFUCAB satisfactory evidence of its competency to perform the proposed Work and complete the Project. Such evidence of competency, unless otherwise specified, shall consist of statements covering the Bidder’s past experience on similar work, current work load, a list of equipment that would be available for the Work, and a list of key personnel that would be available and their experience. In addition, each Bidder shall furnish LFUCAB satisfactory evidence of its financial responsibility. The evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the Bidder’s financial resources and liabilities as of the last calendar year or the Bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the Bidder shall further certify whether its financial responsibility is approximately the same as stated or report to reflect Bidder’s true financial condition at the time such qualified statement or report is submitted to LFUCAB.

Each Bidder shall submit “evidence of competency” and “evidence of financial responsibility” to LFUCAB with its Bid. Failure to do so will result in the Bidder ineligibility to Bid or disqualification.

Each Bidder shall, at the time its Bid is submitted, submit the name of each Disadvantaged Business Enterprise (DBE) Subcontractor proposed to be used on the Project, as provided in the Bid Form.

20.3 EXAMINATION OF PLANS, SPECIFICATIONS AND SITE. Each Bidder is expected to carefully examine the site of the Project and the Contract Documents. Each Bidder shall satisfy itself as to the character, quality, and quantities of Work to be performed, Materials to be furnished, and as to the requirements of the Contract Documents. Such examinations shall not interfere with Airport operations and shall have prior approval of LFUCAB. If, as a result of any such examination, any Bidder concludes that Materials and labor evidently necessary for proper completion of the Project are not included in the Contract Document, such Bidder shall report such deficiencies or omissions to the Engineer on a timely basis and Engineer shall, by
addendum, make such corrections as are warranted. If a Bidder fails to make such report, and LFUCAB is not otherwise advised of such matter, such Bidder shall be responsible for the costs of any Materials or labor reasonably necessary for proper completion of the Work as evidently intended by the Contract Documents if that Bidder is awarded the Contract. Under no circumstances or conditions will such costs be allowed as an extra by LFUCAB after Award of the Contract.

If, in the opinion of any interested Bidder, there is any doubt or ambiguity as to the meaning of any part of the Contract Documents, such Bidder shall submit such matter to the Engineer in writing, and deliver by fax, courier or postal service, and received by the Engineer not less than Seventy Two (72) Hours prior to the time scheduled for the opening of Bids (unless otherwise directed by the Engineer), in order that the necessary explanations or corrections may be made before date and time for opening of the Bids. Any such additions, changes, clarifications or corrections, if required, will be made in written addenda to all who have received these Contract Documents. Acknowledgement of receipt of each addendum shall be mandatory and LFUCAB will not be responsible for any other instructions, interpretations or explanation.

Boring logs and other records of subsurface investigations are available for inspection of Bidders. Subsurface information, whether included in the Plans, Specifications, or otherwise is or was made available to the Bidder, was obtained and is intended for LFUCAB’s design and estimation purposes only. Such information has been made available by LFUCAB without warranty, express or implied, for the convenience of all Bidders. It is further understood and agreed that each Bidder is solely responsible for all assumptions, deductions, or conclusions which may make or obtain from its investigation of the boring logs and other records of surface investigations and tests that are furnished as a convenience to the Bidder by LFUCAB.

20.4 CONTENTS OF BID FORMS. LFUCAB shall furnish Bidders with Bid Forms. All papers bound with or attached to the Bid Forms are necessary parts and must not be detached.

   The Bid Documents submitted to LFUCAB shall include: Completed Bid Form, Bidder’s Experience and Qualifications Questionnaire, Disclosure of Lobbying Activities, Bid Guaranty

The Plans, Specifications, and other documents designated in the Bid Form shall be considered a part of the Bid whether attached or not.

20.5 ISSUANCE OF BID FORMS. LFUCAB reserves the right to refuse to issue a Bid Form to a prospective Bidder should the Bidder be ineligible for any of the following reasons:

   (a) Failure to comply with any prequalification regulations of LFUCAB, if such regulations are cited, or otherwise included, in the Bid as a requirement for Bidding.

   (b) Failure to pay, or satisfactorily settle, all bills due for labor and materials on previous contracts with LFUCAB.
(c) Bidder defaulted under previous contracts with LFUCAB, or others, coming to LFUCAB’s attention.

(d) Unsatisfactory work on previous contracts with LFUCAB, or others coming to LFUCAB’s attention.

20.6 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES. LFUCAB may furnish Bidders, with this Bid Package, an estimate of quantities of work to be done and materials to be furnished under these calculations. These estimates are provided only as a basis for comparison of Bids and the Award of the Contract. LFUCAB does not warrant, express or implied, the accuracy of these estimates that the actual quantities involved will correspond exactly therewith; nor shall the Bidder plead misunderstanding or deception because of such estimation of quantities, or in the character, location, or other conditions pertaining to the work. Payment to the Bidder only will be made for the actual quantities of work performed or materials furnished in accordance with the Plans or Specifications. It is understood that the quantities may be increased or decreased as hereinafter provided in the section titled ALTERATION OF WORK AND QUANTITIES of Section 40 without in any way invalidating the Bid prices.

20.7 PREPARATION OF PROPOSAL. The Bidder shall submit a Bid on the form furnished by LFUCAB. All blank spaces in the Bid Forms must be correctly filled in where indicated for each and every item for which a quantity is given. The Bidder shall state the price (written in ink or typed) both in words and numerals for which Bidder proposes to do each Pay Item furnished in the Bid. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The Bidder shall sign its Bid correctly and in ink. If the Bid is made by an individual, the individual’s name and post office address must be shown. If made by a partnership, the name and post office address of each individual partner of the partnership must be shown. If made by a corporation, the person signing the proposal shall be given the name of the state under the laws of which the corporation was chartered and the names, titles, and business address of the president, secretary, and the treasurer. If signed by an L.L.C., the managing member must sign. Anyone signing a proposal as an agent shall file evidence of his authority to do so and that the signature is binding upon the firm or corporation.

20.8 IRREGULAR BIDS. Bids shall be considered irregular for the following reasons:

(a) If the Bid is on a form other than that furnished by LFUCAB, or if LFUCAB’s form is altered, or if any part of the Bid Form is detached.

(b) If there are any unauthorized additions, conditional or alternate pay items, or irregularities of any kind which make the Bid incomplete, indefinite, or otherwise ambiguous.

(c) If the Bid does not contain a Unit Price for each pay item listed in the Bid, (if this is a Unit Price Contract), except in the case of authorized alternate pay items, for which the Bidder is required to submit a price for each alternate separately.
(d) If the Bid contains unit prices that are obviously unbalanced (if Unit Prices are applicable).

(e) If the Bid is not accompanied by the Bid Guaranty specified in the Contract Documents.

(f) If the Bid does not acknowledge that the Bidder received all addendums.

(g) If the Bid does not list all Subcontractors whose work will consist of 5% or more of the Bid.

(h) If the Bid fails to conform with the delivery requirements.

LFUCAB reserves the right to reject any irregular proposal and the right to waive informalities, technicalities or irregularities if such waiver is in best interest of LFUCAB.

20.9 BID GUARANTY. Each separate Bid shall be accompanied by a certified check, irrevocable Bank Letter of Credit or other specified acceptable collateral, in the amount of 10% of the total amount of Bid. Such check, or other collateral, shall be made payable to LFUCAB. Bid bonds must be signed or countersigned by a Kentucky authorized agent of the Surety. The Bid Guaranty shall be forfeited and surrendered to LFUCAB as an agreed amount of Liquidated Damages in the event that the unsuccessful Bidder fails to enter into the Contract.

Each Bid that is submitted by a joint-venture Bidder shall be accompanied by an irrevocable Bank Letter of Credit, or a satisfactory Bid Bond which binds each party to the venture, jointly and severally. In addition, each such Bid shall be accompanied by the binding joint venture agreement for that joint-venture which shall be subject to review and approval by LFUCAB.

20.10 DELIVERY OF BID. Each Bid submitted shall be placed in a sealed envelope plainly marked with the project number, location or Airport, and name and address of the Bidder on the outside. When sent by mail, preferably registered or certified, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No Bid will be considered unless received at the place specified in the advertisement before the time specified for opening bids. Bids received after the Bid Opening time shall be returned to the Bidder unopened.

20.11 WITHDRAWAL OR REVISION OF BIDS. A Bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the Bidder’s request for withdrawal is received by LFUCAB in writing or by telegram, or by fax, or by e-mail before the time specified for opening bids. Revised Bids must be received at the place specified in the advertisement before the time specified for Bid Opening all bids.

20.12 PUBLIC OPENING OF BIDS. Bids shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend.

Bids that have been withdrawn (by written or telegraphed request) or received after the time specified for opening bids shall be returned to the Bidder unopened.
20.13 DISQUALIFICATION OF BIDDERS. A Bidder shall be considered disqualified for any of the following reasons:

(a) Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

(b) Evidence of collusion among Bidders. Bidders participating in such collusion shall be disqualified as Bidders for any further work by the LFUCAB until any such participating Bidder has been reinstated by the LFUCAB as a qualified Bidder.

(c) If the Bidder is considered to be in “ineligible” for any reason specified in the Subsection titled ISSUANCE OF PROPOSAL FORMS of this Section.

(d) If the Bidder does not hold a valid certificate of responsibility and license as required by state and/or local law.

20.14 PROJECT AGREEMENT AND LOCAL LABOR. LFUCAB will encourage the successful Bidder (Contractor) to enter into a project agreement, or other agreement, to reduce the risk of work stoppages or other labor related delays during the terms of the Project.

LFUCAB will encourage the successful Bidder (Contractor) to employ local labor for all but supervisory personnel for the Project.

END OF SECTION 20
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY
BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 30 - AWARD AND EXECUTION OF CONTRACT

30.1 CONSIDERATION OF BIDS. All Bids will be compared on the basis of the total Contract Price proposed by the Bidders, and, if appropriate, prices of authorized alternate items.

Until the award of the Contract is made, LFUCAB reserves the right to reject a Bid for any of the following reasons, which are in addition to any of the reasons set forth in the Contract Documents:

(a) If the Bid is irregular as specified in the subsection titled IRREGULAR BIDS of Section 20.

(b) If the Bidder is disqualified for any of the reasons specified in the subsection titled DISQUALIFICATION OF BIDDERS of Section 20.

In addition, until the award of a Contract is made, LFUCAB reserves the right to reject any and all Bids, waive technicalities, irregularities or informalities, if such waiver is in the best interest of LFUCAB and in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new Bids; or proceed with the Work otherwise. All such actions shall promote LFUCAB’s best interests.

30.2 AWARD OF CONTRACT. It is anticipated that LFUCAB will make and give the Notice of Award, if a Contract is to be awarded, to the successful Bidder within thirty (30) Calendar Days after Bids are received. However, LFUCAB reserves a period of ninety (90) Calendar Days after receipt of Bids during which time the award may be made and given.

LFUCAB proposes to award the Contract to the lowest responsive and responsible Bidder, as determined by LFUCAB, and in the best interest of LFUCAB, in its sole discretion. Bidder shall be “responsive” if it has submitted a Bid which conforms in all material respects to the Invitation for Bids. Bidder must also show that it has met the goals for DBE participation or, if failing to meet the goals, has made acceptable good faith efforts to meet the established goals for DBE participation.

A Bidder shall be deemed “responsible” if it has the capability in all respects, including financial and experience, to perform fully the Contract requirements, and the integrity and reliability which will assure good faith performance.
30.3 CANCELLATION OF AWARD. LFUCAB reserves the right to cancel the award without liability to the Bidder, except return of Bid Guaranty, at any time before the Contract Documents have been fully executed by all parties and are approved by LFUCAB in accordance with Subsection titled APPROVAL OF CONTRACT in this Section.

30.4 RETURN OF BID GUARANTY. All Bid Guaranties, except those of the two lowest Bidders, will be returned immediately after LFUCAB has made a comparison of Bids as hereinbefore specified in the Subsection titled CONSIDERATION OF BIDS of this Section. Bid Guaranties of the two lowest Bidders will be retained by LFUCAB until such time as an award is made, at which time the unsuccessful Bidder’s Guaranty will be returned. The successful Bidder’s Guaranty will be returned as soon as LFUCAB receives the Contract Bonds as specified in the Subsection titled REQUIREMENT OF CONTRACT BONDS in this Section.

30.5 REQUIREMENT OF CONTRACT BONDS. Within fourteen (14) Calendar Days of receipt of the Notice of Award, the successful Bidder shall furnish LFUCAB a Performance Bond and a separate Payment Bond, which have been fully executed by the Bidder and its Surety, guaranteeing the performance of the Contract and the payment of all legal debts that may be incurred by reasons of the successful Bidder’s performance of the Work. The surety Bonds shall be on the forms furnished by LFUCAB and attached hereto or in a form acceptable to LFUCAB in its sole discretion. Unless otherwise specified in this Section, the surety Bonds shall each be in the sum equal to 100% of the Contract Price. The Bonds shall be from U.S. Treasury listed and approved Surety.

30.6 EXECUTION OF CONTRACT. The successful Bidder shall sign (execute) the necessary agreements for entering into the Contract and return such Contracts to LFUCAB, along with the fully executed surety Bonds specified in the Section titled REQUIREMENT OF CONTRACT BONDS, within fourteen (14) Calendar Days from the date mailed or otherwise delivered to the successful Bidder. If the Contract is mailed, special handling is recommended. A minimum of two (2) copies of the complete Contract Documents shall be forwarded to the successful Bidder for execution.

30.7 APPROVAL OF CONTRACT. Upon delivery to LFUCAB of the Contract and Bonds executed by the successful Bidder, LFUCAB shall complete the execution, and return the fully executed Contract to the successful Bidder, which shall consist of LFUCAB’s approval to be bound by the successful Bidder’s Bid and the terms of the Contract.

30.8 FAILURE TO EXECUTE CONTRACT. Failure of the successful Bidder to execute the Contract and furnish the required surety Bonds within the fourteen (14) Calendar Day period specified in the Section titled APPROVAL OF CONTRACT in this Section, shall be just cause for cancellation of the award and the forfeiture of the Bid Guaranty, not as penalty, but as liquidation of the damages incurred by LFUCAB.

30.9 INSURANCE REQUIREMENT. As a condition of this Contract and prior to any equipment or personnel entering upon the Project Site and/or doing any Work under this Contract, the Contractor and/or Subcontractor shall secure and maintain such insurance policies as will protect LFUCAB, Engineer, the Contractor, Subcontractors, and all other persons who
may be similarly exposed by virtue of the Contractor’s performance of the of the Contract, from claims of bodily injuries, death, or property damage which may arise from operations under this Contract. Such policies shall be in accordance with the limits and types set forth in the Special Conditions and shall provide for the payment of attorney’s fees, and costs incurred as a result of such exposure to LFUCAB. The insurance shall be provided by a company or companies authorized to do business in the Commonwealth of Kentucky. Contractor shall provide certificates of insurance acceptable to the Owner (in the LFUCAB’s sole discretion) evidencing compliance with this Section 30.9 and the Special Conditions: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon LFUCAB’s written request.

LFUCAB and its designers, consultants and contractors shall be named as an additional insureds for Contractor’s primary and excess policies for Commercial General Liability, Automobile and Pollution Liability using forms CG2010 and CG2037 or equivalent. The additional insured coverage shall include ongoing and completed operations. Contractor’s coverage shall be primary and non-contributory to any of the LFUCAB’s insurance policies with a waiver of subrogation in favor of LFUCAB. This wording shall apply to all coverage except workers compensation. General liability must include a per project aggregate limit. A certificate of insurance reflecting this wording and copies of endorsements are required. The policy limits applicable to the additional insureds shall be the same amount applicable to the named insured or, if the policy provides otherwise, policy limits not less than the amounts required under this Contract. All such insurance shall be written on an occurrence basis except for professional liability which shall be claims made (if applicable). Professional Liability insurance shall be maintained by Contractor a minimum of 36 months after Project completion.

The certificates and insurance policies required by this Section 30.9 and the Special Conditions shall contain a provision that coverages offered under the policies will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to LFUCAB. The Contractor shall provide such written notice within five (5) business days of the date that the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever occurs first.

An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted within the final application for payment.

In no event shall any failure of LFUCAB to receive certified copies or certificates of policies required under the Contract or to demand receipt of such certified copies or certificates prior to Contractor commencing the work be construed as a waiver by LFUCAB of Contractor’s obligation to provide insurance. The obligation to procure and maintain any insurance required by this Contract is a separate responsibility of the Contractor and independent of the duty to furnish a certified copy or certificate of such insurance policies.

If the Contractor fails to purchase and maintain, or require to be purchase and maintained, any insurance required under this Contract, LFUCAB may, but shall not be obligated to, upon five (5) day’s written notice to the Contractor, purchase such insurance on behalf of the Contractor.
and shall be entitled to reimbursement by Contractor upon demand or withholding from any outstanding application for payment.

The Contractor shall cause each Subcontractor to (1) procure insurance of the type (but not necessarily the limits) specified in this Contract and (2) name the LFUCAB, Engineer, Contractor, and Subcontractors as additional insureds under the Commercial General Liability policy. The additional insured endorsement included on the Subcontractor’s Commercial General Liability policy shall state that coverage is afforded the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor. If the additional insureds have other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis. The amount of the insurer’s liability under this insurance policy shall not be reduced by the existence of such other insurance.

30.10 DBE PROGRAM RECORD KEEPING AND COMPLIANCE. To permit LFUCAB to properly monitor compliance with its DBE Program by the Contractor and its Subcontractors and Vendors, LFUCAB requires the following:

(a) Contractor shall maintain all records and documents of payments made to DBE’s on this Project for three (3) years following completion of the Project and Final Payment.

(b) Subcontractors shall also maintain records and documents of payment, actually received on this Project for three (3) years following receipt of retention.

30.11 NOTICE OF PENALTIES FOR NONCOMPLIANCE. LFUCAB hereby notifies Contractor and its Subcontractors and Vendors that, in addition to any and all remedies available to LFUCAB under this Contract, at law and equity for noncompliance with LFUCAB’s DBE Program, LFUCAB will notify DOT of any false, fraudulent or dishonest conduct in connection with the DBE Program. The DOT may refer the matter to the Department of Justice for criminal prosecution or to the Inspector General for an action under suspension and disbarment. If, upon notice, Contractor fails to correct noted deficiencies, LFUCAB may: (1) withhold payment; (2) sanction and/or reprimand; (3) terminate the contract; or (4) take other action as appropriate.

END OF SECTION 30
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY
BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 40 - SCOPE OF THE WORK

40.1 INTENT OF CONTRACT. The intent of the Contract Documents is to provide for the construction and completion, in every detail, of the Project. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the Project in accordance with the Contract Documents.

40.2 ALTERATION OF WORK AND QUANTITIES. LFUCAB reserves and shall have the right, without invalidating the Contract, to make such alterations in the Work by ordering Extra Work or by adding to or deducting from the Work, as may be necessary or desirable, in LFUCAB’s sole discretion, to complete the Work in an acceptable manner.

Unless otherwise specified herein, the Engineer shall be and is hereby authorized to make such alterations as may increase or decrease the originally awarded Contract quantities, provided that the aggregate of such alterations does not change the total Contract cost, or the total cost of any Major Contract item by more than 25% (total cost being based on the Unit Prices and estimated quantities in the awarded Contract.) Alterations which do not exceed the 25% limitation shall not invalidate the Contract nor release the Surety, and the Contractor agrees to accept payment for such alterations if the altered Work has been a part of the original Contract. These alterations which are for Work within the general scope of the Contract shall be covered by the “Change Orders” issued by the Engineer. Change Orders for altered Work shall include extensions of time where, in the Engineer’s opinion, such extensions are commensurate with the amount and difficulty of added Work.

Should the aggregate amount of altered Work exceed the 25% limitation hereinbefore specified, such excess altered Work shall be covered by Supplemental Agreement. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a Supplemental Agreement, the Owner reserves the right to terminate the Contract with respect to the item and make other arrangements for its completion.

The value of any such authorized Extra Work, alteration or change may be determined by one or more of the following:

(a) By written proposal prepared and submitted by the Contractor, and approved and accepted by the LFUCAB. Such written proposal may contain not more than fifteen (15%) mark-up over Net Cost, it being agreed and understood that said 15% mark-up shall be added one time only by the Contractor and/or any Subcontractor, but not by both, and which mark-up shall cover the cost of any additional bond premium, among other things. Such written proposal
shall identify: all elements of the Work, including quantities of materials to be added or deleted; the Unit Prices of those materials; the amount of labor to be added or deleted; the hourly labor rates; type, amount and duration of equipment required and the hourly rental rate of that equipment. Such proposal shall be submitted in the format indicated on Work Alteration Cost Analysis contained in Attachment #3 to these documents and shall be submitted within fourteen (14) Calendar Days of receipt of a request for proposal from LFUCAB.

(b) By Unit Prices stipulated in the Contract Documents, if any, or which are subsequently agreed upon by the Contractor and LFUCAB, plus any additional bond premium.

(c) If neither of the above methods (a or b) is applicable or agreeable to both the Contractor and the LFUCAB (it being agreed that in cases where the costs for extra work, alterations or changes are covered by Unit Prices specified in the Contract Documents the value of such extra work, alteration or change shall be determined only on such Unit Price basis), and if the LFUCAB, in its sole judgment, elects to proceed with such extra work, the Contractor shall be paid on the basis of the Net Cost of said work, alteration or change, plus an additional fifteen percent (15%) of such Net Costs, which 15% shall cover the cost of any additional Bond premiums, among other things. It is agreed and understood that said additional 15% shall be added only one time, whether such extra work, alteration or change is done by the Contractor and/or any Subcontractor, and shall not be added by both. Pending final determination of value, payments to the Contractor, if any, on account of such extra work, alterations or changes shall be made by LFUCAB only upon estimates of the Engineer.

(d) Owner, in its sole discretion, may terminate the Contract with respect to any extra Work item covered by Supplemental Agreement, and make other arrangements for its completion.

40.3 OMITTED ITEMS. The Engineer may, in LFUCAB’s best interest, omit from the Work any Contract item, except major contract items. Major Contract items may be omitted by a Change Order. Such omission of Contract Items shall not invalidate any other Contract provision or requirement.

Should a Contract item be omitted or otherwise ordered not to be performed, the Contractor shall be paid for all Work performed towards completion of such item prior to the date of the order to omit such an item. Payment for Work performed shall be in accordance with the subsection title PAYMENT FOR OMITTED ITEMS of Section 90.

40.4 EXTRA WORK. Should acceptable completion of the Contract require the Contractor to perform an item of work for which no basis of payment has been provided in the original Contract or previously issued change order, the same shall be called extra work. Extra Work that is within the general scope of the Contract shall be covered with the written Change Order in accordance with the requirements specified in the Order, and shall contain any adjustment to the Contract Time that, in the Engineer’s opinion, is necessary for completion of Extra Work.

When determined by the Engineer to be in the Owner’s best interest, the Engineer may order the Contractor to proceed with Extra Work covered by the original Contract, and to proceed with
Supplemental Agreement under the terms of Section 90, entitled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK.

Any claim for payment of Extra Work that is not covered by written agreement (Change Order or Supplemental Agreement) shall be rejected by the LFUCAB.

40.5 MAINTENANCE OF TRAFFIC. It is the explicit intention of the Contract Documents that the safety of the public, as well as the Contractor’s equipment and personnel, are the most important considerations. It is understood and agreed that the Contractor, and its Subcontractors shall provide for the free and unobstructed movement of vehicles and persons, of aircraft in the Air Operations Areas of the Airport, with respect to its own operations and operations of all its Subcontractors as specified in the subsection titled LIMITATIONS OF OPERATIONS of Section 80. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the Airport as specified in the Subsection titled CONTRACTOR’S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS in Section 70.

With respect to its own operations and the operations of all of its Subcontractors, the Contractor shall provide marking, lighting, and other means of identifying personnel; equipment; vehicles; storage areas; and any work areas or conditions that might be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicle at the Airport.

When the Contract requires the maintenance of vehicular traffic, on an existing road, street, or highway during the Contractor’s performance of Work that is otherwise provided for in the Contract Documents, plans, and specifications, the Contractor shall keep such road, street, or highway open to all traffic and shall provide such maintenance as may be required to accommodate traffic. The Contractor shall furnish, erect, and maintain barricades, warning signs, flagmen, and other traffic control devices in reasonable conformity with the manual of the Uniform Traffic Control Devices for Streets and Highways (published by the United States printing office), unless otherwise specified herein. The Contractor shall also construct and maintain in a safe condition any temporary conditions necessary for ingress to and egress from abutting property or intersecting roads, streets, or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway. However, the Contractor shall keep all roads, streets, and highways free from all the dirt and debris at all times during the performance of the Contract and shall provide the necessary manpower and equipment to do so, including street sweeping equipment. This requirement shall apply to all construction haul routes, whether on or off Airport premises. Additionally, the Contractor shall sprinkle any unpaved haul route, so as to keep dust to levels acceptable to the Engineer. No additional compensation shall be paid for compliance with this Section 40.5. Should the Contractor fail to perform cleanup required in this Section, LFUCAB shall have the right to arrange for such to be done and to unilaterally deduct the actual cost thereof plus 15% from any funds due the Contractor.
The Contractor shall make its own estimate of all labor, materials, equipment, and incidentals necessary for providing the maintenance of aircraft and vehicular traffic as mentioned herein, the cost of maintaining vehicular traffic is included in the Contract Price.

40.6 REMOVAL OF EXISTING STRUCTURES. All existing Structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing Structures are otherwise specified in the Contract Documents or to remain in place. The cost of removing such existing Structures shall not be paid for directly, but shall be included in the Contract Price, unless otherwise provided in the Contract Documents.

Should the Contractor encounter an existing Structure (above or below ground) in the Work for which the disposition is not indicated in the Plans, the Engineer shall be notified prior to disturbing such Structure. The disposition of existing Structures so encountered shall be immediately determined by the Engineer in accordance with the provisions of the Contract Documents.

Except as provided in the Section titled RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK, it is intended that all existing materials or Structures that may be encountered (within the lines, grades, or grading sections established for completion of the Work) shall be utilized in the Work as otherwise provided for in the Contract Documents and shall remain the property of LFUCAB when so utilized in the Work.

The Contractor shall not excavate, remove or otherwise disturb any material, Structure or part of a Structure which is located outside the lines, grades or grading sections established for the Work, except where such excavation or removal is provided for in the Contract Documents.

40.7 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades or grading sections, the use of which is intended by the terms of the Contract Documents to be either embankment of waste, it may at its option either:

(a) Use such material in the Project, providing such use is approved by the Engineer and is in conformance with the Specifications applicable to such use; or

(b) Remove such material from the site, upon written approval of the Engineer; or

(c) Use such material for his own temporary construction on-site; or

(d) Use such material as intended by the terms of the Contract Documents.

If Contractor desires to exercise option a, b, or c, it shall request the Engineer’s written approval in advance of such use.

If the Engineer approves the Contractor’s request to exercise a, b, or c, the Contractor shall be paid for the excavation or removal of such material at the applicable Unit Price. The Contractor shall replace, at its own expense, such removed or excavated material with an agreed equal
volume of material that is acceptable for use in constructing embankment, backfill, or otherwise
to that extent that such replacement material is needed to complete the Project. The Contractor
shall not be charged for its use of such material so used in the Work or removed from the site
unless specifically named in the Contract Documents.

Should the Engineer approve the Contractor’s exercise of option (a), the Contractor shall be paid,
at the applicable Unit Price, for furnishing and installing such material in accordance with
requirements of the Contract Documents.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of
a structure which is located outside the lines, grades, or grading sections established for the
work, except where such excavation or removal is provided for in the Contract Documents,
plans, or Specifications.

It is understood and agreed that the Contractor shall make no claim for extension of the Contract
Time by reason of its exercise of Options a, b or c.

40.8 FINAL CLEANING UP. Upon completion of the Work and before Final Acceptance
and Final Payment can be made, the Contractor shall remove from the site all machinery,
equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or
portions of trees. Contractor shall cut all brush and woods within the limits indicated and shall
leave the site in a neat and presentable condition. Material cleared from the site and deposited on
adjacent property will not be considered as having been disposed of satisfactorily, unless the
Contractor has obtained written permission from such property owner. The Contractor shall
leave the Project Site in broom-clean condition.

40.9 MOBILIZATION AND DEMOBILIZATION. No separate payment will be allowed
for preparatory work and operations necessary for the movement of personnel, equipment,
supplies, and incidentals to and from the Project site; for the establishment of offices, buildings
and other facilities necessary for Work on the Project, and for other Work or operations which
must be performed or costs incurred when beginning work on the Project. Mobilization and
demobilization are considered a subsidiary obligation of the Contractor and as such shall be
included in the Unit Prices Bid for the various items specified in the Contract Documents or in
the lump sum Contract Price Bid, as the case may be.

END OF SECTION 40
SECTION 50 - CONTROL OF WORK

50.1  AUTHORITY OF THE ENGINEER.  In addition to the authority set forth in Section 10, hereof, the Engineer shall decide any and all questions that may arise as to the quality and acceptability of the Materials furnished, Work performed, and as to the manner of performance and rate of progress of the Work.  The Engineer shall decide all questions that may arise as to the interpretation of the Specifications or Plans relating to the Work, and the fulfillment of the Contract Documents on the part of the Contractor.  The Engineer shall have the right to approve or reject the amount and quality of the several kinds of Work to be performed and Materials to be furnished which are to be paid for under the Contract Documents.

50.2  CONFORMITY WITH PLANS AND SPECIFICATIONS.  Unless otherwise specified, all Work and all Materials furnished shall be in acceptably close conformity with the lines, grades, grading sections, cross sections, dimensions, material requirements, elevations, and testing requirements that are specified (including specified tolerances) in the Contract Documents.

If the Engineer finds the Materials furnished, Work performed, or the finished Project do not within acceptably close conformity with the Plans and Specifications, but that the portion of the Work affected will, in Engineer’s opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to LFUCAB, the Engineer will advise LFUCAB of this determination that the affected Work be accepted and remain in place.  In this event, the Engineer will document this determination and recommend to LFUCAB a basis of acceptance which will provide for an adjustment in the Contract Price for the affected portion of the Work.  The Engineer’s determination and recommended Contract Price adjustment will be based on good engineering judgment and such tests or retests of the affected Work as are, in the Engineer’s opinion, necessary.  Changes in the Contract Price shall be covered by Change Order(s) as applicable.

If the Engineer finds the Materials furnished, Work performed, or the finished product are not within acceptably close conformity with the Plans and Specifications and have resulted in an unacceptable finished product, the affected Work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the Engineer’s written orders.

For the purpose of this Section, the term “acceptably close conformity” shall not be construed as waiving the Contractor’s responsibility to complete the Work in accordance with the Contract Documents.  The term also shall not be construed as waiving the Engineer’s right to insist on
strict compliance with the requirements of the Contract Documents during the Contractor’s prosecution of the Work, when, in the Engineer’s opinion, such compliance is essential to provide the acceptable finished portion of the Project.

Additionally, for the purpose of this Section, the term “acceptably close conformity” is intended to provide the Engineer with the authority to use good engineering judgment in determinations as to the acceptance of Work that is not in strict conformity, but will provide a finished product equal to or better than that intended by the requirements of the Contract Documents.

50.3 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS. The Contract, Plans, Specifications, and all referenced standards cited are essential parts of the Contract Documents. A requirement occurring in one is binding as though occurring in all. They are intended to be complimentary and to describe and provide for a complete Project. In case of discrepancy, calculated dimensions will govern over scaled dimensions; Contract Technical Specifications shall govern over Contract General Conditions, Plans, cited standards for materials and testing, and cited FAA Advisory Circulars; Contract General Conditions shall govern over Plans, cited standards for materials and testing, and cited FAA Advisory Circulars.

The Contractor shall not take advantage of any apparent error or omission on the Plans or Specifications or other Contract Documents. In the event that the Contractor discovers any apparent error or discrepancy among the Contract Documents (including drawings or layouts) or between the Contract Documents and physical conditions of the Project site, or if the Contractor discovers any errors or omissions in the Contract Documents, Engineer’s instructions or directions, or otherwise, it shall be the duty of the Contractor to immediately give the Engineer Written Notice thereof and the Engineer shall promptly verify and resolve such errors, omissions or discrepancies, upon receipt of such Notice from Contractor. Any Work done by the Contractor after such discovery, any before verification, correction, approval or authorization by the Engineer, shall be done at the Contractor’s risk. The Engineer’s interpretation and decision in all such matters shall be final.

50.4 COOPERATION OF CONTRACTOR. The Contractor will be supplied with two copies each of the Plans and Specifications. Contractor shall have available at the Project Site at all times one copy each of the Plans and Specifications. Additional copies of Plans and Specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the Work to facilitate the progress thereof, and Contractor shall cooperate with the Engineer and Engineer’s inspectors and with other Contractors in every way possible. The Engineer shall allocate the Work and designate the sequence of construction in case of a controversy between contractors. The Contractor shall have a competent Superintendent on the Project at all times who is fully authorized and empowered to make binding decisions, and sign on behalf of the Contractor, all Change Orders on non-major items, as the Contractor’s agent on the site.

The Superintendent shall be experienced in the type and manner of the construction required to be performed and shall be capable of reading and thoroughly understanding the Plans and Specifications and shall receive and fulfill instructions from the Engineer or his authorized
representative. If, in the opinion of LFUCAB, the Contractor’s Superintendent is not supervising the Project appropriately, LFUCAB may request, and the Contractor shall comply with LFUCAB’s request to remove the Superintendent from the Project and replace the Superintendent.

50.5 COOPERATION BETWEEN CONTRACTORS. LFUCAB reserves the right to contract for or perform other or additional work on or near the site covered by this Contract.

When separate Projects are let within the limits of any one Project, each contractor shall conduct its Work so as not to interfere with or hinder the process of completion of the Work being performed by other contractors. Contractors working on the same Project shall cooperate with each other as directed.

Each contractor shall assume all liability, financial or otherwise, in connection with their respective Contract Documents and shall defend, protect, and save harmless LFUCAB, including attorneys’ fees and costs, from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced by them because of the presence or operations of other contractors working within the limits of the same Project.

The Contractor shall arrange its Work and shall place and dispose of all the Materials being used so as not to interfere with the operations of other contractors within the limits of the same Project. Contractor shall join its Work with that of the others in an acceptable manner and shall perform it in a proper sequence to that of the others.

50.6 CONSTRUCTION LAYOUT AND STAKES. The Engineer will provide base initial horizontal and vertical control only as shown on the Plans. The Contractor shall provide field layout of the horizontal and vertical control and shall furnish all other lines, grades and measurements necessary for layout and construction of the Project. The Engineer will perform checks, as deemed necessary, on layout and grades set by the Contractor. Whether or not the Engineer performs such checks, the responsibility shall remain with the Contractor.

50.7 AUTOMATICALLY CONTROLLED EQUIPMENT. Whenever batching or mixing plant equipment is required to be operated under the Contract Documents and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period of 48 hours following the breakdown or malfunction, provided this method of operation will produce results which conform to all other requirements of the Contract Documents, and has prior approval of the Engineer.

50.8 AUTHORITY AND DUTIES OF INSPECTORS. Inspectors employed by LFUCAB shall be authorized to inspect all Work done and all Material furnished. Such inspection may extend to all or any part of the Work and to the preparation, fabrication, or manufacture of the Materials to be used. Inspectors are not authorized to revoke, alter or waive any provision of the Contract Documents. Inspectors are not authorized to issue instructions contrary to the Plans and Specifications, authorize change orders or to act for the Contractor.
Inspectors employed or designated by LFUCAB shall be authorized to notify the Contractor, or Contractor’s representative of any failure of the Work or Materials to conform to the requirements of the Contract Documents, and to reject such nonconforming Materials in question until such issues can be referred to the Engineer for a decision. Inspectors are not authorized to approve or issue instructions for extra work or execute change orders.

50.9 INSPECTION OF THE WORK. All Materials and each part or detail of the Work shall be subject to inspection by the Engineer. The Engineer shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the Engineer requests it, the Contractor, at any time before acceptance of the Work, shall remove or uncover such portions of the finished Work as may be directed. After examination, the Contractor shall restore said portions of the Work to the standards required by the Specifications. Should the Work exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts exposed will be paid for as extra Work; but if the Work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor’s expense.

Any Work done or Materials used without supervision or inspection by an authorized representative of LFUCAB or the Engineer may be ordered removed and replaced at the Contractor’s expense, unless LFUCAB’s representative or the Engineer failed to inspect after having been given reasonable notice in writing that the Work was to be performed.

Should the Work include relocation, adjustment, or any other modification to existing facilities that are not the property of LFUCAB, authorized representatives of LFUCAB and the owner of such facilities shall have the right to inspect such Work. Such inspection shall in no sense make any facility owner a party to the Contract and shall in no way interfere with the rights of the parties to this Contract.

An Inspector’s knowledge of, or purported acceptance of, the Work or any part thereof, shall in no way relieve the Contractor from meeting the requirements of the Contract Documents. Additionally, any information supplied by an Inspector to the Contractor shall be subject to the provisions of the Contract Documents and any FAA Advisory Circulars that may be referenced therein.

50.10 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. All Work which does not conform to the requirements of the Contract Documents will be considered unacceptable, unless otherwise determined acceptable by the Engineer as provided in the Section titled CONFORMITY WITH PLANS AND SPECIFICATIONS.

Unacceptable Work, whether the result of poor workmanship, use of defective materials, damage resulting in whole or in part from the negligence of the Contractor found to exist prior to the Final Acceptance of the Work, shall be removed immediately and replaced in an acceptable...
manner, and in accordance with the provisions of the Section titled CONTRACTOR’S RESPONSIBILITY FOR WORK in Section 70.

No Work shall be done without the lines and grades having been provided by the Engineer. Work done contrary to the instructions of the Engineer, Work done beyond the lines shown on the Plans or as given, except in herein specified, or any extra Work done without authority, will be considered unauthorized and will not be paid for under the provisions of the Contract Documents. Work so done may be ordered removed or replaced at the Contractor’s expense.

In the event that the Contractor, upon receipt of Written Notice from the Engineer to do so, does not cause the unacceptable Work or condemned Materials to be removed within the reasonable time specified and fixed by the Written Notice, LFUCAB may replace or remove such unacceptable Work or Material and store such Material, at the expense of the Contractor. If the Contractor does not pay LFUCAB for all costs incurred by LFUCAB in connection therewith, within ten (10) Calendar Days Written Notice, LFUCAB may sell, in any commercially reasonable manner, any such stored Materials, the proceeds of such sale to be first applied to any sums due LFUCAB from the Contractor, with any balance thereof to be paid to the Contractor. At LFUCAB’s sole option, LFUCAB may deduct the costs incurred by LFUCAB for any such replacement or removal of Work or Materials from any monies due, or to become due, the Contractor under the Contract Documents.

50.11 LOAD RESTRICTIONS. The Contractor shall comply with all legal load restrictions in the hauling of Materials on public roads beyond the limits of the Work. A special permit will not relieve the Contractor of liability for damage which may result from the moving of Material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by his hauling equipment and shall correct such damage at its own expense.

50.12 MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain and adequately protect the Work during construction and until the Work is accepted. This maintenance shall constitute continuous and effective Work prosecuted day by day, with adequate equipment and forces so that the Work is maintained in satisfactory condition at all times. The Contractor shall protect LFUCAB’s property from damage or loss arising in connection with the Work or the Contract Documents, during construction of the Project and until the Work is accepted by LFUCAB.

In the case of a contract for the placing of a coarse upon a coarse or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.
All costs of maintenance Work during construction and before the Project is accepted shall be included in the Contract Price, and the Contractor will not be paid an additional amount for such Work.

**50.13 FAILURE TO MAINTAIN THE WORK.** Should the Contractor at any time fail to maintain the Work as provided in the Section titled MAINTENANCE DURING CONSTRUCTION, the Engineer shall immediately notify the Contractor of such non-compliance. Lack of such Notice from the Engineer shall not relieve the Contractor of its responsibility. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

In the event that the Contractor fails to respond to the Engineer’s notification, the Engineer may suspend any Work. Any maintenance cost incurred by LFUCAB to correct the condition shall be deducted from monies due or to become due to the Contractor.

**50.14 SECURED AREAS.** The Contractor may be given certain secured areas or such as may be created for the Contractor’s use. The Contractor may also be given access to certain restricted or security areas. Such access shall be granted in writing by LFUCAB. The Contractor shall observe all rules and regulations pertaining to said areas. Violations of any and all rules and regulations and/or failure to properly lock, with all locks, said areas shall be grounds for a fine of up to $500 per violation and repeated violations shall be cause to remove the Contractor, its equipment, vehicles, and/or personnel from said areas and utilize other contractors of LFUCAB’s selection, with all costs so incurred chargeable to the Contractor. Any fines assessed against LFUCAB by the FAA or any other unit of government shall be assessed against the Contractor, if the assessment of such fines shall be due in whole or in part to the act or omission of the Contractor, its Subcontractors, suppliers or any of its or their employees. Any fines provided for in this Section may, at LFUCAB’s sole discretion, be deducted from funds due or to become due to the Contractor.

**50.15 PARTIAL ACCEPTANCE.** If at any time during the progress of the Project the Contractor satisfactorily and substantially completes a usable unit or portion of the Work, the immediate use of which will benefit LFUCAB, Contractor may request the Engineer to make final inspection of that unit. If the Engineer finds, upon inspection, that the unit has been satisfactorily completed in compliance with the Contract Documents, Engineer may accept it as being completed, and the Engineer may declare that portion of the Work substantially complete. Such partial acceptance and beneficial occupancy by LFUCAB shall not void or alter any provisions of the Contract Documents, or require the release of retainage unless otherwise required by the Contract Documents or KRS 371.410.

**50.16 SUBSTANTIAL COMPLETION.** The Engineer shall issue a certification of Substantial Completion in writing when the following occur:

(a) Public authorities have given necessary approval;
(b) LFUCAB has received all required warranties and documentation as provided in Section 50.17 below; and

(c) The Engineer’s inspection of the Work determines that LFUCAB may enjoy beneficial use or occupancy and may use, operate, and maintain the project in all respects, for its intended purpose.

Within thirty (30) days of Substantial Completion, LFUCAB shall release the retainage less an amount equal to two hundred percent (200%) of the LFUCAB’s reasonably estimated cost of the balance of any contractor’s or subcontractor’s contractually obligated, yet uncompleted, work remaining.

50.17 DOCUMENTS AND WARRANTIES REQUIRED PRIOR TO SUBSTANTIAL COMPLETION. Prior to the Contractor requesting an inspection for Substantial Completion, the Contractor shall require all Subcontractors, suppliers, and materialmen to deliver to the Contractor their requests for final payment, all payroll, and tax certificates, lien waivers, warranties and guarantees, as-built or record drawings and similar documents. The Contractor will submit all of these documents to the Engineer at the time of the Engineer’s inspection for Substantial Completion. Contractor shall furnish an affidavit, in the form attached to these documents, affirming that there are no outstanding liens on the Project and all claims for labor, Materials and supplies have been paid or satisfied, supported by such additional affidavits or evidence of payment as LFUCAB may reasonably require, including the form attached to these documents from all Subcontractors and Materialmen. The warranties provided for Substantial Completion shall not begin to run until Final Acceptance as defined by Section 90.9.

50.18 FINAL INSPECTION. Upon receipt of Written Notice from the Contractor of presumptive completion of the Work, the Engineer, Contractor, and LFUCAB shall make an inspection. If all construction provided for and contemplated by the Contract Documents is found to be completed in accordance with the Contract Documents, such inspection shall constitute the final inspection. The Engineer shall notify the Contractor in writing of Final Acceptance as of the date of the final inspection.

If, however, the inspection discloses any Work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of same, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the Work, another inspection will be made which shall constitute the final inspection, provided the Work has been satisfactorily completed. In such event, the Engineer will make the final acceptance as of the date of the final inspection.

50.19 CLAIMS FOR ADJUSTMENT AND DISPUTES. If for any reason, the Contractor deems that additional compensation is due for Work or Materials not clearly provided for in the Contract Documents, Contractor shall give Written Notice to the Engineer of this intention to claim such additional compensation before the Work begins on which the claim is based. Such Notice by the Contractor and the fact that the Engineer has kept account of the cost of the Work shall not in any way be construed as proving or substantiating the validity of the claim or entitlement to additional compensation. When the Work on which the claim for additional
compensation is based has been completed, the Contractor shall, within ten (10) Calendar Days, submit the written claim to the Engineer who will present it to LFUCAB for final determination within thirty (30) days of its receipt. If Contractor does not provide the requisite Written Notice prior to performing the Work, Contractor hereby acknowledges and agrees that it has waived any claim for additional compensation.

Nothing in this Section shall be construed as a waiver of the Contractor’s right to dispute final payment based on differences in measurements or computations.

50.20 **COST REDUCTION INCENTIVE/VALUE ENGINEERING.** The provisions of this Section will apply only to Contracts awarded to the lowest Bidder pursuant to competitive Bidding.

On Projects with base Contract amounts in excess of $100,000, the Contractor, after signing the Contract, may submit to the Engineer, in writing, proposals for modifying the Plans, Specifications, or other requirements of this Contract for the sole purpose of reducing the cost of construction. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the Project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, design, and safety standards. This provision shall not apply unless the proposal submitted is specifically identified by the Contractor as being presented for consideration as a Value Engineering proposal.

Not eligible for the cost reduction proposals are changes in the basic design of a pavement type, runway and taxi lighting, visual aids, hydraulic capacity of drainage facilities, or changes in grade or alignment that reduce the geometric standards of the Project.

As a minimum, the following information shall be submitted by the Contractor with each Value Engineering proposal:

- (a) a description of the existing Contract requirements for both the Work and the proposed changes, with a discussion of the comparative advantages and disadvantages of each;
- (b) an itemization of the Contract requirements including general and special provisions, Plans, drawings, and Specifications that must be changed if the proposal is adopted;
- (c) a detailed estimate of the cost of performing the Work under the existing Contract Documents or under the proposed changes;
- (d) a statement of the time by which a Change Order adopting the proposal must be issued;
- (e) the Contract items of Work affected by the proposed changes, including any quantity variation attributable to them.

The Contractor may withdraw, in whole or in part, at any cost reduction proposal not acceptable to the Engineer, within the period specified in the Proposal. The provisions of this Section shall
not be construed to require the Engineer to consider any cost reduction proposal which may be submitted.

The Contractor shall continue to perform the Work in accordance with the requirements of the Contract until a Change Order incorporating the cost reduction proposal has been issued. If a Change Order has not been issued by the date upon which the Contractor’s cost reduction proposal specifies that a decision should be made, or such other date as the Contractor may subsequently have requested in writing, such cost reduction proposal shall be deemed rejected.

The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings from the adoption of any and all part of such proposal. In determining the estimated net savings, the Engineer may disregard the Contract Bid prices if, in an Engineer’s judgment, such prices do not represent a fair measure of the value of the Work to be performed or deleted.

LFUCAB may require the Contractor to share in the LFUCAB’s costs of investigating a cost reduction proposal submitted by the Contractor as a condition of considering such a proposal. Where such a condition is imposed, the Contractor shall in writing, grant full authority for LFUCAB to deduct the cost of investigating a cost reduction proposal from amounts payable to the Contractor under the Contract Documents.

If the Contractor’s cost reduction proposal is accepted in whole or in part, such acceptance will be by Change Order, which shall specifically state that it is executed pursuant to this Section. Such Change Order shall incorporate the changes in the Plans or Specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted and shall include any conditions upon which the Engineer’s approval is based. The Change Order shall also set forth the estimated net savings attributable to the cost reduction proposal. The net savings shall be determined as the difference in costs between the original contract costs for the involved Work items and the costs occurring as a result of the proposed change. The Change Order shall also establish the net savings agreed upon and shall provide for adjustment in the contract price that will divide the net savings equally between the Contractor and LFUCAB.

The Contractor’s 50% share of the net savings shall constitute full compensation to the Contractor for the cost reduction proposal and the performance of the Work.

Acceptance of the cost reduction proposal and performance of the cost-reduction Work shall not extend the time of completion of the Contract, but may reduce it, unless specifically otherwise provided for in the Contract Change Order.

The Contractor’s Surety shall be notified of the acceptance of any cost reduction proposal. The Surety’s consent thereto is not required.

50.21 DELAY IMPACT, ACCELERATION, HINDRANCE, INTERFERENCE, RESEQUENCING OR OTHER TIME/COST RELATED CLAIMS. Any claims for delays, which for purposes of this Contract shall include but not be limited to impacts claims, claims for acceleration (constructive or actual), hindrances, interference, resequencing or any other claims
relating to schedule and time impacts by the Contractor shall be supported by sufficient documentation to prove that damages were incurred. Contractor shall only be entitled to compensation for its actual direct project costs incurred due to such delays caused in whole or in part by LFUCAB. Delay on a portion of the project shall not constitute delay for the entire Project unless supported by the original and latest CPM Project schedules. Delays on items not on the critical path shall not be construed as a delay to the Project.

Contractor further agrees that it may only seek delay damages or damages resulting from hindrance or other impact to the extent documented by actual costs directly resulting from the delay and entitlement demonstrated, and Contractor shall not be entitled to seek from LFUCAB damages for actual or alleged loss of efficiency, constructive acceleration, lost productivity, stacking of trades, home office overhead, expectant underrun, season change, extended overhead, impact damages, profit upon damages for delay or similar damages calculated by formula or trade data or studies.

If, for LFUCAB’s convenience, the Contractor is required to maintain equipment, trailers, utility services, sanitation services or to maintain the Project site, LFUCAB will pay for actual direct costs incurred.

Costs of salaries and wages for personnel originally assigned to the Project, but laid off or reassignment due to LFUCAB delay, will not be paid by LFUCAB, nor will idle personal equipment costs (superintendent’s vehicle, etc.) be paid for while not in use on the Project.

END OF SECTION 50
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 60 - CONTROL OF MATERIALS

60.1 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The Materials used in the Work shall conform to the requirements of the Contract Documents. Unless otherwise specified, such Materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of Materials, the Contractor shall furnish complete statements to the Engineer or to the origin, composition, and manufacture of all Material’s to be used in the Work. Such statements shall be furnished promptly after execution of the Contract, but, in all case, prior to delivery of such Materials.

At the Engineer’s option, Materials may be approved at the source of supply before delivery is started. If it is found after investigation that sources of supply for previously approved Materials do not produce specified products, the Contractor shall furnish Materials of equal kind or quantity from other sources, and prior to doing so shall notify the Engineer in writing.

The Contractor shall furnish airport lighting equipment that conforms to the requirements of cited material specifications. In addition, where an FAA specification for Airport lighting equipment is cited in the Plans or Specifications, the Contractor shall furnish such equipment that is:

(a) Listed in the FAA Advisory Circular (AC) 150/5345-1, Approved Airport Lighting Equipment, that is in effect on the date of advertisements; and,

(b) Produced by the manufacturer qualified by the FAA to produce such specified and listed equipment.

The Contractor shall furnish a list of Airport lighting equipment giving manufacturer and catalog number of the items.

60.2 SAMPLES, TESTS, AND CITED SPECIFICATIONS. All Materials used in the Work shall be inspected, tested, and approved by the Engineer before incorporation in the Work. Any Work in which untested Materials are used without approval or written permission of the Engineer shall be performed at the Contractor’s risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the Engineer, shall be removed at the Contractor’s expense. Unless otherwise designated, tests in accordance with the cited standard methods of AASHTO or ASTM which are current on the date of advertisement for Bids will be
made by and at the expense of LFUCAB. Samples will be taken by a qualified representative of the LFUCAB. All Materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation of the Work. Copies of all tests will be furnished to the Contractor’s representative at Contractor’s request.

60.3 CERTIFICATION OF COMPLIANCE. The Engineer may permit the use, prior to sampling and testing, of certain Materials or assemblies when accompanied by manufacturer’s certificate of compliance stating that such Materials or assemblies fully comply with the requirements of the Contract Documents. The certificate shall also be signed by the manufacturer. Each lot of such Materials or assemblies delivered to the Work must be accompanied by a certificate of compliance in which the lot is clearly identified.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with Contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as of approved by the Engineer.

When a Material or assembly is specified by a “brand name or equal” and the Contractor elects to furnish the specified “brand name,” the Contractor shall be required to furnish the manufacturer’s certificate of compliance for each lot of such Material or assembly delivered to the Work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

(a) Conformance to the specified performance, testing, quality, or dimensional requirements; and

(b) Suitability of the Material or assembly for the use intended in the Contract Work.

If the Contractor proposes to furnish an “or equal” Material or assembly, Contractor shall furnish the manufacturer’s certificate of compliance as hereinbefore described for the specified brand name Material or assembly. However, the Engineer shall be the sole judge as to whether the proposed “or equal” is suitable for use in the Work.

The Engineer reserves the right to refuse permission for use of Materials or assemblies on the basis of certificates of compliance.

60.4 PLANT INSPECTION. The Engineer or Engineer’s authorized representative may inspect, at its source, and specified Material or assembly to be used in the Work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or Materials to be used in the work and to obtain samples required for his acceptance of the Material or assembly.

In the event the Engineer conducts plant inspections, the following conditions shall exist:
(a) The Engineer shall have the cooperation and assistance of the Contractor and producer with whom he has contracted for Materials, and the Contractor shall make the necessary arrangements with the producer or supplier to facilitate the required inspections.

(b) The Engineer shall have full access at all reasonable times to such parts of the plant that concern the manufacture of production of Materials being furnished.

(c) If required by the Engineer, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Office or working space should be conveniently located with respect to the plant.

It is understood and agreed that LFUCAB shall have the right to retest any Material which has been tested and approved at the source of supply after it has been delivered to the site. The Engineer shall have the right to reject only Material which, when retested, does not meet the requirements of the Contract Documents.

60.5 STORAGE OF MATERIALS. Materials shall be stored so as to assure the preservation of their quality and fitness for the Work. Contractor shall be responsible for the safe storage and preservation of stored Materials and shall be liable for any loss or damage or claims of loss or damage resulting from the storage or subsequent use, until the Materials are incorporated into the Work and accepted by the Engineer. Stored Materials, even though approved before storage, may be inspected prior to their use in the Work. Stored Materials shall be located so as to facilitate their prompt inspection. The Contractor shall coordinate the storage of all Materials with the Engineer. Materials to be stored on Airport property shall not create an obstruction to air navigation, nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the Plans, the storage of Materials and the location of the Contractor’s plant and parked equipment or vehicles shall not be used for storage purposes without the written permission of LFUCAB or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of Materials on private property. Upon request, the Contractor shall furnish the Engineer with a copy of the property owner’s permission. The Materials, regardless of where stored, shall remain the property of the Contractor, and any loss or theft of or damage to the stored Material shall remain the responsibility of the Contractor.

All storage sites on private or Airport property shall be restored to their original condition by the Contractor at its entire expense, except as otherwise agreed to (in writing) by LFUCAB or lessee of the property.

60.6 UNACCEPTABLE MATERIALS. Any Material or assembly that does not conform to the requirements of the Contract Documents shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected Material from the site of the work unless otherwise instructed by the Engineer.

No rejected Material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the Work until such time as the Engineer has approved its use in the Work.
60.7 OWNER-FURNISHED MATERIALS. The Contractor shall furnish all Materials required to complete the Work, except those specified herein (if any) to be furnished by LFUCAB. LFUCAB-furnished Materials shall be made available to the Contractor at the location specified herein. LFUCAB shall have the right to furnish part or all of the Materials and expendable items required by the Work, but must exercise its right to do so at or before the pre-Bid conference. Following that, LFUCAB may agree, in writing, with the Contractor to allow LFUCAB to do so.

All costs of handling, transportation from the specified location to the site of the work storage, and installing LFUCAB-furnished Materials shall be included in the Contract Price in which such LFUCAB-furnished Material is used.

After any LFUCAB-furnished Material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies which may occur during the Contractor’s handling, storage, or such use of LFUCAB-furnished Materials. LFUCAB will deduct from any monies due or to become due the Contractor any costs incurred by LFUCAB in making good such losses due to the Contractor’s handling, storage, or use of LFUCAB-furnished Materials.

60.8 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. The Contractor shall review, stamp to indicate its approval, identified by LFUCAB’s submittal registration identification number, and submit, not less than twenty (20) Calendar Days prior to the time the Contractor needs the Engineer’s approval of such submission(s) and in such sequence as to cause no delay in the Work or in the work of LFUCAB or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents. The Engineer shall review such submissions with reasonable promptness and make desired corrections. The Contractor, thereafter, shall make any corrections required by the Engineer.

By approving and submitting Shop Drawings, Product Data, and Samples, the Contractor represents that it has determined and verified all Materials, field measurements, and field construction criteria related thereto and that it has checked and coordinated the information contained with such submittals with the requirements of the Work and the Contract Documents.

The Contractor shall submit, in maximum sheet size of 30" by 42", one (1) reproducible sepia and one (1) blue line print of all Shop Drawings and six (6) copies of manufacturer’s standard schematic drawings and/or catalog sheets for stock manufactured items. Three (3) approved copies will be distributed to the Contractor for its use. The Contractor may obtain such other copies as may be needed, by paying the reproduction costs.

The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer’s approval of Shop Drawings, Product Data, or Samples unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Engineer’s approval thereof.
The Contractor shall direct specific written attention on resubmitted Shop Drawings, Product Data, or Samples, to revisions other than those requested by the Engineer on previous submittals.

No portion of the Work requiring submissions of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Engineer. All such portions of the Work shall be in accordance with approved submittals.

END OF SECTION 60
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 70 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

70.1 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of all Federal, State and local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed in the Work, including those rules or regulations promulgated from time to time by LFUCAB. Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders and decrees and shall defend, protect, hold harmless and indemnify LFUCAB and LFUCAB’s officers, agents, employees or servants from and against any claim or liability arising from or related to the violation of any such law, ordinance, regulation, order or decree, whether by the Contractor, its employees, agents, or Subcontractors’ employees or agents, and such indemnification shall not require LFUCAB to advance costs, attorneys’ fees, consultants’ fees or expenses of any kind. In the event that the Contractor performs any Work, does any act, or omits to act, which the Contractor knows or should have known to be contrary to, or necessary to comply with, such laws, ordinances, rules or regulations, unless directed to do so by the Engineer in writing, the Contractor shall be solely liable for and shall bear all cost arising therefrom. Nothing shall be construed as permitting the Engineer to authorize any illegal act, or to waive any legal requirement.

70.2 PERMITS, LICENSES AND TAXES. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due prosecution of the Work. If the Contractor observes that the Contract Documents are at variance with the laws, or ordinances, rules and regulations, Contractor shall promptly notify the Engineer in writing. If the Contractor performs any work, knowing it to be inconsistent with such laws, ordinances, rules and regulations, and without notice to the Engineer, Contractor shall bear all costs therefore.

70.3 PATENTED DEVICES, MATERIALS, AND PROCESSES. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, Contractor shall provide for such use by suitable legal agreement with the patentee or owner. The Contractor and its surety shall defend, indemnify, and save harmless LFUCAB, any third party, or political subdivision from any and all claims for infringement by reason or the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify LFUCAB for any costs, expenses, attorneys’ fees and damages which it may be obliged to pay by reason of an infringement at any time during the prosecution or after the completion of the work.
70.4  RESTORATION OF SURFACES DISTURBED BY OTHERS.  LFUCAB reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA, or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another governmental agency at any time during the progress of the Work.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the Work, the Contractor shall cooperate with such owners by arranging and performing the Work in this Contract so as to facilitate such construction, reconstruction, or maintenance by others, whether or not such work by others is listed above. When ordered as Extra Work by the Engineer, the Contractor shall make all necessary repairs to the Work which are due to such authorized work by others, unless otherwise provided for in the Contract Documents. The Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for damages, other than documented actual costs, for any delay to the Work resulting from such authorized work.

It is the intention of this Section to provide for both foreseen and unforeseen work by owners of utility services and other facilities located at the Blue Grass Airport. Such owners have legal rights and obligations under some form of easement with the LFUCAB. Every effort has been made during the design phase to coordinate the Contract work with such owners. Where there is conflict between an existing utility service (or facility) and the Work or where the owner of the utility or facility must perform work to construct, reconstruct, or maintain its utility or facility, such work must be noted in the Plans. In addition, all known utility services or facilities that are within the limits of the Work are shown on the Plans (regardless of whether or not there is a conflict of Work to be performed by the LFUCAB).

Contractor shall control its operations to prevent the unscheduled interruption of such utility services and facilities.

It is understood and agreed that LFUCAB does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or Structures that may be shown on the Plans or encountered during the Work. Any inaccuracy or omission in such information shall not relieve the Contractor of responsibility to protect such existing features from damage or unscheduled interruption of service.

Prior to commencing the Work in the general vicinity of an existing utility service or facility, the Contractor shall notify the owner of such service or facility of its plans. If, in the Contractor’s opinion, the owner’s assistance is needed to locate the utility service or facility or the presence of a representative of the owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner no later than two normal business days prior to the Contractor’s commencement of operation in such general vicinity. The Contractor shall furnish a written summary of the notification to the Engineer.

The Contractor’s failure to give the notice hereinabove provided shall be cause for the Engineer to suspend the Contractor’s operations in the general vicinity of a utility service or facility.
Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, Contractor shall immediately notify the proper authority and the Engineer, and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such event, shall cooperate with the utility service or facility owner and the Engineer continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to Contractor operations whether or not due to negligence or accident.

70.5 SANITARY, HEALTH, AND SAFETY PROVISION. The Contractor shall provide and maintain in a neat, sanitary condition, such accommodations for the use of its employees as may be necessary to comply with the requirements of the State and local boards of health, or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, State, and local laws, rules and regulations concerning direct safety and health standards. The Contractor shall not require any worker to work in surroundings which are unsanitary, hazardous, or dangerous to the worker’s health and safety, and not in substantial compliance with such laws, rules, and regulations.

70.6 PUBLIC CONVENIENCE AND SAFETY. The Contractor shall control its operations and those of its Subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to its own operations and those of its subcontractors and suppliers in accordance with the Section titled MAINTENANCE OF TRAFFIC of Section 40 hereinbefore specified and shall limit such operations for the convenience and safety of the traveling public as specified in the Section titled LIMITATION OF OPERATIONS in Section 80 hereinafter.

70.7 BARRICADES, WARNING SIGNS, AND HAZARD MARKINGS. The Contractor shall furnish, erect, and maintain all barricades, warning signs, and markings for hazards necessary to protect the public and the work. When used during periods of darkness, such barricades, warning signs and hazard markings shall be suitably illuminated.

For vehicular and pedestrian traffic, the Contractor shall furnish, erect, and maintain barricades, warning signs, lights and other traffic control devices in reasonable conformity with the Manual of Uniform Traffic Control Devices for Streets and Highways (published by the United States Government Printing Office).

When the Work requires closing an Air Operations Area of the Airport or a portion of such an area, the Contractor shall furnish, erect, and maintain temporary markings and associated lighting conforming to the requirements of the FAA Advisory Circular 150/5349-1, Marking of Paved Areas on Airports.
The Contractor shall furnish, erect, and maintain markings and associated lighting of open trenches, excavations, temporary stockyard piles, and his parked construction equipment that may be hazardous to the operation of emergency fire-rescue or maintenance vehicles on the airport in reasonable conformance to FAA Advisory Circular 150/5370-2E, Safety on Airports During Construction Activity.

The Contractor shall identify each motorized vehicle or piece of construction equipment in reasonable conformance to FAA Advisory Circular 150/5370-2E.

The Contractor shall furnish and erect all barricades, warning signs, and marking for hazards prior to commencing work in or on such areas and shall maintain the barricades, warning signs, and markings in good working order, until their dismantling is directed by the Engineer.

Open-flame type lights are not permitted within the air operations areas of the Airport.

Open trenches, excavations and stockpiled material at the Project site shall be prominently marked with red flags and barriers and lighted by approved light units during hours of restricted visibility and darkness. Waste material shall be removed often enough to insure that it does not create a hazard. Debris shall not be deposited on any active portion of a Runway, Taxiway or Apron or in any areas prohibited in these Contract Documents.

70.8 USE OF EXPLOSIVES. Use of explosives is prohibited in the Airport without prior written approval of the Engineer. When the use of explosives is necessary for the prosecution of Work, the Contractor shall exercise the utmost care not to endanger life or property, including the Work. The Contractor shall be responsible for all damage or injury resulting from the use of explosives.

All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactorily to the engineer and, in general, not closer than 1,000 feet from the Work or from any building, road, or other place of human occupancy.

The Contractor shall notify each property owner and public utility company having structure or facilities in proximity to the site of the work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable them to take such steps as they deem necessary to protect their property from injury.

The use of electrical blasting caps shall not be permitted on or within 1,000 feet of the Airport property.

70.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage and land monuments and property marks until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.
The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the Work, resulting from any act, omission, neglect, or misconduct in its manner or method of executing the Work, or at any time due to defective work or materials, and said responsibility will not be released until the contractor’s liability for this project or contract is complete.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, it shall restore, at its own expense, such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an otherwise acceptable manner.

70.10 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall defend, indemnify and save harmless the Engineer and LFUCAB and their officers, employees and agents from all suits, actions, or claims of any kind or character brought because of any injuries or damage received or sustained by any person, persons or properties arising from or relating to the Work including all attorneys’ fees, consultants’ fees, costs and expenses; or on account or of in consequence of any neglect in safeguarding the Work; or because any act or omission, neglect, or misconduct of said Contractor, the Contractor’s employees or agents, its Subcontractors and or suppliers, or any other person for whom Contractor may be liable; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the Worker’s Compensation Act, or any other law, ordinance, order or decree. Money due the Contractor under and by virtue of the Contract may be retained for the use of LFUCAB in an amount determined in the sole discretion of LFUCAB until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid have been settled and suitable evidence to that effect furnished to LFUCAB, unless retainage is due the Contractor pursuant to KRS 371.410(2) when a suit, action or claim arise or is ongoing. If retainage is due the Contractor, then LFUCAB shall release retainage less two hundred percent (200%) of LFUCAB’s reasonable estimate of the possible costs associated with the suit, action or claim including all attorneys fees, consultant’s fees, costs and expenses. The money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that LFUCAB shall be adequately indemnified by public liability and property damage insurance, Performance Bond, Payment Bond or the Surety.

70.11 THIRD PARTY BENEFICIARY CLAUSE. No provision of any part of the Contract will be or is intended to create in the public or any member thereof a third party beneficiary status nor to authorize anyone not a party to the Contract the right to maintain any suit for personal injuries, property damage or other damages.

70.12 OPENING SECTIONS OF THE WORK TO TRAFFIC. No portion of the Project may be opened by the Contractor for public use until ordered by the Engineer in writing. Should it be necessary for the Contractor to complete portions of the Contract Work for the beneficial occupancy of LFUCAB prior to the completion of the entire contract, such “phasing” of the Work shall be herein specified and indicated on the Plans. When so specified, the Contractor shall complete such portions of the Work on or before the date specified or as otherwise
specified. The parties agree in advance that by executing the Contract, LFUCAB shall have the right as to assess Liquidated Damages, separate and apart from any other liquidated damages provided for elsewhere herein, for each separately phased item or area at the rate prescribed for each. The Contractor shall make its own estimate of the difficulties involved in arranging its work to permit phase construction and the phasing shall be included in the Contractor’s Progress Schedule.

Upon completion of any portion of the Work listed above, the procedure for acceptance by LFUCAB shall be in accordance with the Subsection titled PARTIAL ACCEPTANCE of Section 50.

Should it become necessary to open a portion of the Work to public traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the Engineer, such portion of the Work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the Work and shall not constitute either acceptance of the portion of the Work so opened or a waiver of any provision of the Contract. Any damage to the portion of the work so opened that is not attributable to traffic, shall be repaired by the Contractor at his expense.

The Contractor shall make his own estimate of the inherent difficulties involved in completing the Work under the conditions herein described and shall not claim any added compensation by reason or delay or increased cost due to the temporary or intermittent opening of a portion of the Contract Work.

70.13 CONTRACTOR’S RESPONSIBILITY FOR WORK. Until the Engineer’s Final Acceptance of the entire completed Work, excepting only those portions of the Work accepted in accordance with the subsection titled PARTIAL ACCEPTANCE in Section 50, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements of from any other cause, whether arising from the execution or from the non-execution of the Work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the Work occasioned by any of the above causes before Final Acceptance and shall bear the expense thereof except without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane, or other cataclysmic phenomenon of nature, or acts of the public enemy or government authorities.

If the Work is suspended for any cause whatsoever, the Contractor shall be responsible for the Work and shall take such precautions as necessary to prevent damage to the Work. The Contractor shall provide for normal drainage and shall erect necessary, temporary structures, signs, or other facilities at his expense. During such period of suspension of Work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings, and soddings furnished under his contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.
70.14 CONTRACTOR’S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS. As provided in the Subsection titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this Section, the Constructor shall cooperate with the Owner of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA), or a utility service of another government agency that may be authorized by LFUCAB to construct, reconstruct, or maintain such utility services or facilities during the progress of the Work. In addition, the Contractor shall control its operations to prevent the unscheduled interruption of such utility services and facilities.

It is understood and agreed that LFUCAB does not guarantee the accuracy or the completeness of the location information relating to such utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor from his responsibility to protect such existing features from damage or unscheduled interruption of service.

The Contractor shall, upon execution of the Contract, notify the owners of all utility services or other facilities of his plan of operations. Such notification shall be in writing, with a simultaneous copy to the Engineer.

In addition to the general written notification hereinbefore provided, it shall be the responsibility of the Contractor to keep the individual owners advised of changes in his plan of operations that would affect such owners.

Forty-eight (48) hours prior to commencing the Work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such owner of his plan of operation. If, in the Contractor’s opinion, the owner’s assistance is needed to locate the utility service or facility or the presence of a representative of the owner is desirable to observe the work, such advise should be included in the notification. Such notification shall be given in the most expeditious means to reach the utility owner’s person to contact no later than two normal business days prior to the Contractor’s commencement of operations in such general vicinity. The Contractor shall furnish a written summary or copy of the notification of the Engineer.

The Contractor’s failure to give the two days’ notice hereinafore provided shall be the cause for the Engineer to suspend the Contractor’s operations in the general vicinity of a utility service or facility pending proper notification.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use excavation methods acceptable to the Engineer within three feet of such outside limits at such points as may be required to insure protection from damage.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, Contractor shall immediately notify the proper authority and the Engineer and shall take all responsible measures to prevent further damage or interruption of service. The Contractor, in such event, shall cooperate with the utility service or facility owner and the
Engineer continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to his operations, whether due to negligence or accident. LFUCAB reserves the right to deduct such costs from any monies due or which may become due the Contractor.

**70.15 FURNISHING RIGHT-OF-WAY.** LFUCAB will be responsible for furnishing all rights-of-way upon which the Work is to be constructed in advance of the Contractor’s operations.

**70.16 PERSONAL LIABILITY OF PUBLIC OFFICIALS.** In carrying out any of the Contract Documents or in exercising any power or authority granted to the Engineer by this Contract, there shall be no liability upon the Engineer, Engineer’s authorized representatives, or any official of LFUCAB either individually or as an official of LFUCAB.

**70.17 NO WAIVER OF LEGAL RIGHTS.** Upon completion of the Work, LFUCAB will expeditiously make final inspection and notify the Contractor of Final Acceptance. Such Final Acceptance, however, shall not preclude or prohibit LFUCAB from correcting any measurement, estimate, or certificate made before or after completion of the Work, nor shall LFUCAB be precluded or prohibited from recovering from the Contractor or, following a default of the Contractor, or the Surety, such overpayment as may be sustained, or by any failure on the part of the Contractor to fulfill its obligations under the Contract. A waiver on the part of LFUCAB of any breach of any part of the Contract Documents shall not be held as a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the Contract Documents, shall be liable to LFUCAB for latent defects, fraud, or such gross mistakes that may not be apparent, or as regards LFUCAB’s rights under any warranty or guaranty.

**70.18 ENVIRONMENTAL PROTECTION.** The Contractor shall comply with all Federal, State, and local laws and regulation controlling pollution of the environment. Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and other reservoirs with fuels, oils, bitumens, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

**70.19 ARCHEOLOGICAL AND HISTORICAL FINDINGS.** Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of the Interior.

Should the Contractor encounter, during its operations, any building, or part of a building, structure, or object which is incongruous with its surroundings, Contractor shall immediately cease operations in that location and notify the Engineer. The Engineer will immediately investigate the Contractor’s findings and will direct the Contractor to either resume operations or to suspend operations as directed.
If the Engineer orders the suspension of the Contractor’s operations in order to protect an archeological or historical finding, or orders the Contractor to perform extra work, such shall be covered by an appropriate Contract Modification as provided in the subsection titled EXTRA WORK in Section 40 and the subsection titled PAYMENT FOR EXTRA WORK AND FORCE ACCOUNT WORK of Section 90. If appropriate, the Contract Modification shall include an extension of Contract Time in accordance with the subsection titled DETERMINATION AND EXTENSION OF CONTRACT TIME of Section 80.

END SECTION 70
GENERAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

SECTION 80 - PROSECUTION AND PROGRESS

80.1 SUBLETTING OF CONTRACT. LFUCAB will not recognize nor deal directly with any Subcontractor on the Work. The Contractor shall, pursuant to and in accordance with the Contract Documents, be solely responsible for carrying out the Work. When the Work is in progress, the Contractor shall be represented either in person, by a qualified Superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Engineer.

The Contractor must retain fifty-one percent (51%) of the Work covered by the Contract and utilize personnel employed by the Contractor on a full-time basis in the prosecution of that portion of the Work. The remaining forty-nine percent (49%) of the Work may be subcontracted in accordance with the provisions of the Contract Documents.

When the Contractor wishes to subcontract portions of its Contract, Contractor shall submit copies of the Subcontracts to the Engineer for approval.

Any Subcontractor whose Subcontract shall exceed fifteen (15%) percent of the Contract or has a Contract Price of $200,000, whichever is greater, shall furnish the Contractor with Performance and Payment Bonds, each equaling 100% of the Subcontract Price. The requirements of Section 30.5 REQUIREMENTS OF CONTRACT BONDS shall apply to the bonds required herein.

The Contractor may not assign the Work without prior written approval of LFUCAB and the Surety.

Contractor understands that it will not be reimbursed for Work performed by its Subcontractors unless and until the Contractor ensures that such Subcontractors are promptly paid for the Work they have performed. Contractor agrees to include the following provision in each Subcontract entered into in connection with the Work:

Contractor agrees to pay Subcontractor for satisfactory performance of its Subcontract any undisputed amounts due (as defined by KRS 371.400(11)) within fifteen (15) business days from the receipt of each payment made to Contractor by LFUCAB. Within fifteen (15) business days after the retainage has been released by LFUCAB to the Contractor for Substantial Completion, the Contractor shall release to the Subcontractor its proportional share of the retainage. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following prior written approval by the LFUCAB. This clause applies to both DBE
and non-DBE Subcontractors. Contractor further agrees to use appropriate alternative dispute resolution mechanisms satisfactory to the LFUCAB to resolve payment disputes with Subcontractors to further promote prompt payment.

The failure of the Contractor to carry out the requirements for prompt payment to Subcontractors is a material breach of this Contract, and in such event, at LFUCAB’s sole discretion, LFUCAB may make direct payment of the amount delayed to the Subcontractor by joint check which Contractor hereby agrees to endorse, and deduct such amount from the amounts due to the Contractor under this Contract. In an appropriate instance, the failure to make prompt payment may also result in the termination of this Contract or the taking of such other legally available remedies as LFUCAB deems appropriate.

80.2 NOTICE TO PROCEED. The Notice to Proceed shall state the date on which is expected the Contractor will begin the construction and from which date Contract Time will be charged. The Contractor shall begin the Work to be performed under the Contract within ten (10) days of the date set by the Engineer in the written Notice to Proceed. The Contractor shall notify the Engineer at least seventy-two (72) hours in advance of the time actual construction operations will begin. No Work shall be performed prior to the issuance of the Notice to Proceed.

80.3 PROSECUTION AND PROGRESS. Unless waived in writing by the Engineer, the Contractor shall submit the Construction Progress Schedule for the Engineer’s approval within ten days after the effective date of the Notice to Proceed and in any event at least 48 hours prior to commencing any Work on the construction site other than mobilization. The initial Construction Progress Schedule and any updated versions thereof shall be on both a “CPM Network” and “Bar Chart” format and shall contain sufficient detail to insure that accurate, realistic planning has been accomplished, and all activities accounted for, with schedule dates established for both starting and completion times. The completion time(s) in the Construction Progress Schedule shall be within the Contract Time.

The following activities as a minimum must be included and must be relatable to the construction activity which they support:

(a) Dates for Shop Drawings submittals and required approvals.
(b) Dates for Sample and/or certification submittals and corresponding approvals.
(c) Date for submittals of record drawings and maintenance manuals.
(d) Dates for critical Material and Equipment order releases, and required delivery.
(e) Dates for all critical coordination activities required to insure timely support from LFUCAB, utility companies, or other agency personnel.
(f) Detailed construction activities, including all “general” and “Subcontractor’s” Work, and oriented to “identifiable” Work.
(g) Activity sequence logic and phasing as indicated on the contract drawings.

(h) Man loading for each scheduled task with associated costs.

Said Construction Progress Schedule, when approved by the Engineer, may be used to establish major construction operations and to evaluate the progress of the Project. The Contractor shall provide sufficient Materials, equipment, and labor to guarantee the completion of the Project in accordance with the Contract Documents and within the Contract Time. It is recommended that the Project schedule be done on a computer to facilitate updating. Requirement that the Contractor revise and submit updated program schedules will be strictly followed. For Projects having a Contract Price in excess of $1,000,000, Project scheduling must be done on a computer using Primavera Project Planner or Microsoft Project.

All planned activities on the Project must be compatible with activities in progress by other contractors. The Engineer will coordinate and establish priorities between contractors when necessary to insure a smooth flow of Work for the Project, and associated Work.

The Construction Progress Schedule shall, regardless of format used, specifically identify constraints between interrelated activities and identify the mandatory sequence of operations or critical path and shall be plotted on a calendar format with not less than weekly divisions, with all activities shown in the proper relationship to calendar time.

Upon the Engineer’s acceptance of the Construction Progress Schedule, the Contractor shall prosecute the Work and measure all progress in accordance therewith.

Every two weeks, the Contractor shall update the Construction Progress Schedule, to the extent necessary to reflect an accurate portrayal of its progress through the preceding day worked, and submit three (3) copies of such “update” to the Engineer by close of operations on Mondays, or by the first “working” day of the affected week, if Monday is a holiday. If actual progress falls, or is expected to fall, seven (7) Calendar Days or more behind schedule for any activity identified in the “mandatory sequence” or “critical path” line, or for any activity which is identified as having a direct effect on that line, the Contractor shall revise the schedule to reflect its plan for progress recovery within Contract Time parameters. Such revised planning shall identify, by affected activity, all planned actions implemented for recovery such as: Use of overtime for extended work hours and/or extended work weeks, use of additional equipment, or adding additional crews. Implementation of these recovery actions as defined in the Construction Progress Schedule shall be visually evident on dates noted therein. The Contractor shall also revise the Construction Progress Schedule when considered necessary by the Engineer to reflect extra work orders which directly affect “mandatory sequence” or “critical path” activities. Three (3) copies of all proposed revisions shall be submitted to the Engineer for review and approval against the same standards applicable for original submittals.

Upon approval of said modified Construction Progress Schedule by the Engineer, the Contractor shall adjust its operations to provide additional Materials, equipment, and labor necessary to meet the revised schedule. If the prosecution of the Work be discontinued for any reason, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations.
Construction shall be accomplished in the sequence shown on the approved Construction Progress Schedule. Any deviation from the sequence indicated therein must be approved by the Engineer. If, in the opinion of the Engineer, the Construction Progress Schedule, as submitted, is inadequate to ensure the completion of the Work within the time limited therefor, or is otherwise not in accordance with the Contract Documents, or if the Work is not being adequately or properly prosecuted in any respect, the Engineer, without deviating from LFUCAB’s rights under the Contract, shall have the right to require the Contractor to submit, within five (5) working days of receipt of request, a new Construction Progress Schedule providing for proper and timely completion of the Work.

Extensions of the Contract Time, or in any incremental completion date required by the Contract Documents, shall not be granted if the delay is caused by strikes which occur after an item of Work or Material delivery is scheduled to have been completed in the latest approved Construction Progress Schedule.

If, in the sole judgment of the Engineer, the Contractor fails to carry out the Work according to the Construction Progress Schedule, or according to other instructions of the Engineer, or in accordance with the Contract Documents, LFUCAB may, upon three (3) Calendar Days notice to the Contractor of its intention to do so, cause such Work to be performed or such deficiencies to be corrected and LFUCAB shall deduct the costs incurred therefor from any sums then or thereafter due the Contractor. Likewise, if, in the judgment of the Engineer, it becomes necessary at any time during the progress of the Project, the Contractor shall, when so ordered and directed by the Engineer, cease Work at any particular point or points, transfer its men to such other point or points and execute such portions of its Work as may be required. Should such transfer of Work be required by the Engineer due to no fault of Contractor, Contract Time if affected, shall be adjusted so as not to incur unfair charge for Liquidated Damages.

80.4 LIMITATIONS OF OPERATIONS. The Contractor shall control its operations and the operations of his Subcontractors and all suppliers so as to provide for the free and unobstructed movement of aircraft in the AIR OPERATIONS AREAS of the Airport.

When the Work requires the Contractor to conduct its operations within the AIR OPERATIONS AREA of the Airport, the Work shall be coordinated with the Airport management (through the Engineer) at least 48 hours prior to commencement of such Work. The Contractor shall not close an AIR OPERATIONS AREA until so authorized by the Engineer and until necessary temporary marking and associated lighting is in place as provided in the subsection titled BARRICADES, WARNING SIGNS AND HAZARD MARKINGS of Section 70.

When the Contract Work requires the Contractor to work within an AIR OPERATIONS AREA of the Airport on an intermittent basis (intermittent opening and closing of the AIR OPERATIONS AREA), the Contractor shall maintain constant communications as hereinafter specified; immediately obey all instructions to vacate work in such AIR OPERATIONS AREA; immediately obey all instructions to resume work in such AIR OPERATIONS AREA. Failure to maintain the specified communications or to obey instructions shall be the cause for suspension of the Contractor’s operations in the AIR OPERATIONS AREA until the satisfactory assurances of future compliances are provided to the Engineer and such suspension shall not change the
Contract Time. Any repetitions of the Contractor’s failure to obey orders to cease operations and/or vacate the AIR OPERATIONS AREA, shall be cause to terminate the Contract.

80.5 CHARACTER OF WORKER’S METHODS AND EQUIPMENT. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the Work to full completion in the manner and time required by the Contract Documents.

All workers shall have sufficient skills and experience to perform properly the Work assigned to them. Workers engaged in special work or skilled work shall have specific experience in such work and in the operation of the equipment required to perform the Work satisfactorily.

Any person employed by the Contractor and the Subcontractor who, in the opinion of the Engineer, does not perform the Work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith from the Project site by the Contractor or Subcontractor employing such person, and shall not be employed again in any portion of the Work without the prior approval of the Engineer.

Should the Contractor fail to remove such person or persons or fail to furnish such suitable and sufficient personnel for the proper prosecution of the Work, the Engineer may suspend the Work by written notice until compliance with such orders. No claims for additional Contract Time shall be granted or requested as a result of Work suspension as herein provided.

All equipment that is proposed to be used on the Work shall be of sufficient size and in such mechanical condition as to meet the requirements of the Work and to produce a satisfactory quality of the Work. Equipment used on any portion of the Work shall be of such size and physical condition that no injury to persons, previously completed Work, adjacent property, or existing Airport facilities will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the Work are not prescribed in the Contract Documents, the Contractor is free to use any methods or equipment that will accomplish the Work in conformity with the requirements of the Contract Documents.

When the Contract specifies the use of certain methods or equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than specified in the Contract, Contractor may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the full reasons for desiring to make the change. If approval is given, the Contractor will remain fully responsible for the producing work in conformity with the Contract Documents. If, after trial use of the substituted methods or equipment, the Engineer determines that the Work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining Work with the specified methods and equipment. The Contractor shall remove any deficient Work and replace it with work of specified quality, or take other such corrective action as the Engineer may direct. No change will be made in Contract Price as a result of authorizing a change in methods or equipment under this Subsection.
80.6 TEMPORARY SUSPENSION OF THE WORK. The Engineer shall have the authority to suspend the Work wholly, or in part, for such period or periods as Engineer may deem necessary, due to the unsuitable weather, or such other conditions as are considered unfavorable for the prosecution of the Work or for such time as necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the Contract Documents.

In the event that the Contractor is ordered by the Engineer, in writing, to suspend Work for some unforeseen cause not otherwise provided for in the Contract Documents and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the Work during the period of shutdown. No allowance will be made for anticipated profits or other alleged consequential damages. The period of shutdown shall be computed from the effective date of the Engineer’s orders to resume the Work. Claims for such compensation shall be submitted to the Engineer within the time period stated in the Engineer’s order to resume the Work. The Contractor shall submit its claim information substantiating the amount shown on the claim. The Engineer shall forward the Contractor’s claim to LFUCAB for consideration in accordance with local laws and ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather, for suspensions made at the request of the Contractor, or for any other delay caused by anyone other than LFUCAB and provided for in the Contract Documents.

If it should become necessary to suspend the Work for an indefinite period, the Contractor shall store all Materials in such manner that they will not become an obstruction nor become damaged in any way. Contractor shall take every precaution to prevent damage or deterioration of the Work performed and provide for normal drainage of the Work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the Airport.

80.7 DETERMINATION AND EXTENSION OF CONTRACT TIME. It is agreed and understood that time is of the essence of the Project and of the Work to be completed under the Contract Documents and of the Contract Time fixed for the performance thereof and where, under the Contract Documents, an additional time may be allowed, or the Contract Time adjusted, for the completion of the Work and the Project, the new Contract Time shall be of the essence of the Contract Documents. If the Contractor finds it impossible, for reasons beyond Contractor’s control, to complete the Project within the Contract Time as specified, Contractor may, at any time prior to the expiration of the Contract Time as extended, make a written request to the Engineer for an extension of time setting forth the reasons believed to justify the granting of such request.

The Contractor may base its request for an extension of the Contract Time for delay in the completion of the Work due to:

(a) An order duly issued by any local, state or federal governmental unit, or agency thereof, including LFUCAB, having proper jurisdiction, by which order a preference, priority or allocation of work may have been established which result in such claimed delay.
(b) Unforeseeable causes beyond the control, and without the fault or negligence, of the Contractor, which shall include, but not necessarily be limited to, acts of God; fires or floods; strikes or other labor actions not called for by Contractor, its employees, its Subcontractors or Subcontractors’ employees, its suppliers or its suppliers’ employees; and act of LFUCAB, but shall not include inclement weather conditions which can be expected to occur in any thirty (30) year period.

The Contractor shall not claim that insufficient time was specified in the Contract Documents as a valid reason for extension of the Contract Time. If the Engineer finds that the Work was delayed because of conditions beyond the control and without the fault of the Contractor, Engineer may extend the time for completion in such amount as the conditions justify. The Engineer’s decision as to whether any extension shall be granted, and if so, how much extension shall be granted, if final and nothing herein shall be construed as giving the Contractor any right to an extension. The new Contract Time shall then be in full force and effect, the same as though it were the original Contract Time.

80.8 FAILURE TO COMPLETE ON TIME. For each Calendar Day or working day, as specified in the Contract, that the Work remains uncompleted after the Contract Time (including all extensions and adjustments as provided in the subsection titled DETERMINATION AND EXTENSION OF CONTRACT TIME of this Section) the sum specified in the Contract as Liquidated Damages will be deducted from any money due or to become due to the Contractor by Change Order executed by LFUCAB. Such deducted sums shall not be deducted as penalty but shall be considered as the previously agreed upon liquidation of a reasonable portion of damages that will be incurred by LFUCAB should the Contractor fail to complete the Work in the time provided by the Contractor.

Permitting the Contractor to continue and finish the Work or any part of it after the time fixed for its completion, or after the date to which time for completion may have been extended, will in no way operate as a waiver on the part of LFUCAB of any other of its rights under the Contract, or to Liquidated Damages.

80.9 DEFAULT AND TERMINATION OF CONTRACT. The Contractor shall be considered in default of his Contract and LFUCAB may terminate the Contract, if the Contractor:

(a) Fails to begin Work under the Contract within the time specified in the “Notice to Proceed” or the Construction Progress Schedule; or

(b) Fails to provide a Construction Progress Schedule and any revisions thereto, required by the Engineer; or

(c) Fails to perform the Work or fails to provide sufficient workers, equipment, or Materials to assure completion of Work in accordance with the terms of the Contract Documents; or
(d) Performs unsuitable work or neglects or refuses to remove unsuitable or defective Materials or to perform such corrective work as may be rejected as unacceptable and unsuitable; or

(e) Discontinues the prosecution of the Work for a period of three (3) calendar days, excluding Saturdays, Sundays, or legal holidays, without the prior or written consent of LFUCAB to do so; or

(f) Fails to resume Work which has been discontinued within three (3) Calendar Days after notice to do so; or

(g) Becomes insolvent or declares bankruptcy, or commits and act of bankruptcy or insolvency; or

(h) Allows any final judgment to stand against him or LFUCAB unsatisfied for a period of ten (10) days; or

(i) Makes an assignment for the benefit of creditors; or

(j) Fails to make payments to subcontractors in accordance with the Contract Documents and KRS 371.405(8), (9), for Materials or labor; or

(k) Persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction; or

(l) For any other good cause shown, or is guilty of a substantial violation of a provision of the Contract Documents, then LFUCAB, upon certification from the Engineer that sufficient cause exists to justify such action, may, without prejudice to the right or remedy and after giving written notice to the Contractor and its surety that the Contractor or its surety shall have ten (10) days to cure the default stated. If the Contractor or surety fails to cure the default described in notice of intent to terminate the Contractor’s right to proceed, the Contract shall, without further notice, be deemed to be terminated and LFUCAB shall then take possession of the site, and of all Materials, equipment, tools, construction equipment, and machinery thereon owned by the Contractor and use the same and may finish the Work, by whatever method LFUCAB deems appropriate. In the event of termination under this Section, LFUCAB may use or appropriate any or all Materials and equipment that have been mobilized for use on the Project, and shall employ such methods or contractors as LFUCAB shall deem appropriate to complete the Project.

If the unpaid balance of the Contract Price exceeds the cost of finishing the Work, including compensation to LFUCAB, for any documented expenses including but not limited to engineering fees, consultant fees, reprocurement costs, attorneys’ fees and costs, or any other costs incurred by LFUCAB occasioned by the termination, such excess shall be paid by the Contractor. If the aforesaid costs exceed the unpaid balance, the Contractor or its surety shall pay the difference to LFUCAB. Any application for payment submitted after the Contractor’s default will be considered a disputed request for payment until all of the aforesaid costs are
incurred. After the aforesaid costs are finally determined, the amount to be paid to the Contractor or LFUCAB shall in any event be so certified by the Engineer to LFUCAB in the Final Payment Application and this obligation of payment shall survive the termination of the Contract. The aforesaid obligation of payment shall also include any Liquidated Damages assessable, either due to delay in completing the Work due to the termination or for any other reason stated in the Contract Documents chargeable to the Contractor and having occurred prior to the termination of the Contract.

80.10 TERMINATION FOR NATIONAL EMERGENCIES. LFUCAB shall terminate the Contract or portion thereof by Written Notice when the Contractor is prevented from proceeding with the Work as a direct result of the Executive Order of the President with respect to the prosecution of war or in the interests of National defense.

When the Contract, or any portion thereof, is terminated before completion of all items of Work in the Contract, payment will be made for the actual number of units or items of Work completed at the Contract Price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for overhead expenses (when not otherwise included in the Contract), and moving equipment to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable Materials obtained or ordered by the Contractor for the Work and that are not incorporated in the Work shall, at the option of the Contractor, be purchased from the Contractor at actual costs as shown by receipted bills and actual costs records at such point of delivery as may be designated by the Engineer.

Termination of the Contract of a portion thereof under this Section 80.10 shall neither relieve the Contractor of its responsibilities for the completed Work, warranties arising therefrom, nor shall it relieve its surety of its obligation for concerning any just claim arising out of the Work performed.

80.11 PROJECT ACCELERATION. In meeting overall construction schedules, it may become desirable for LFUCAB to cause the Contractor to accelerate the Work. In such cases, the LFUCAB will give the Contractor a target date from which the Contractor’s acceleration costs may be calculated. If LFUCAB, in its sole discretion, deems the Contractor’s acceleration costs acceptable and elects to accelerate the completion of the Project, the acceleration costs shall be set forth in a Change Order or written amendment to these Contract Documents. In no event shall LFUCAB be liable for any acceleration costs incurred by the Contractor prior to LFUCAB’s execution of such a Change Order or amendment.

80.12 ENGINEER’S AUTHORITY. The LFUCAB Director of Planning and Development or such qualified person as he may designate to act in said capacity shall have the authority to stop any Work on the Project in order to insure the proper execution of such Work in accordance with the Contract Documents. The Engineer shall also have the authority to reject any and Work or Materials which does not conform to the Contract Documents and to direct the application of
labor and Materials to any part of the Project which in the Engineer’s sole judgment is necessary or required. Neither the Engineer, nor LFUCAB, shall be liable to the Contractor for failure to make any inspection permitted by the Contract Documents, and it shall be the duty of the Contractor to carry out the Project in conformance with the Contract Documents in the absence of any such inspections. The Engineer shall be the interpreter of the Plans and Specifications and will be the judge of the Contractor’s performance under the Contract Documents, will determine the rights of other contractors or Subcontractors, and shall decide any other questions which may arise during the execution of the Project.

END OF SECTION 80
90.1 MEASUREMENT OF QUANTITIES. All Work completed under the Contract will be measured by the Contractor using the United States Customary Units of Measurement. The Engineer will check these measurements as deemed necessary.

The method of measurement and computations to be used in determinations of qualities and Materials furnished and of Work performed under the Contract will be those methods generally recognized as conforming to good engineering practices.

Unless otherwise specified, longitudinal measurements for area compensations will be made horizontally, and no deduction will be made for individual fixtures (or omitted items) having an area of 9 square feet or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans ordered in writing by the Engineer.

Structures will be measured according to neat lines shown on the Plans or as altered to fit field specifications.

Unless otherwise specified, all Contract items which are measured by linear foot such as electrical ducts, conduits, pipe culverts, under-drains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

In computing volumes of excavation the average end area method or a method acceptable to the Engineer will be used when specified by the Engineer.

The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fractures of inches.

The term “ton” shall mean the short ton consisting of 2,000 (907 kilograms) pounds avoirdupois. All Materials which are measured or proportioned by weights shall be weighed on accurate, approved scales by competent, qualified personnel at locations designated by the Engineer. If the Material is shipped by rail, the car weight may be accepted provided that only the actual weight of the Material be paid for. However, car weights will not be acceptable for Material to be passed through mixing plants. Trucks used to haul Material being paid for by weight shall be weighed empty daily at such times as Engineer directs, and each truck shall bear a plainly legible identification mark.
Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be located to at least their water level capacity and all loads shall be leveled when the vehicles arrive at the point of delivery.

When requested by the Contractor and approved by the Engineer in writing, Material specified to be measured by the cubic yard may be weighed and such weights will be converted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method is used.

Bituminous Materials will be measured by the gallon or ton. When measured by volume, such volumes will be measured by 60 degrees Fahrenheit or will be corrected to the volume of the 60 degrees Fahrenheit using ASTM D 1250 for asphalt and ASTM D 633 for tars.

Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as the basis of measurement, subject to correction when bituminous Material has been lost from the car or distributor, wasted, or otherwise incorporated into the Work.

When bituminous Materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

Cement will be measured by the ton or hundredweight.

Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term “lump sum” when used as an item of payment will mean complete payment for the Work described in the Contract.

When a complete structure or structural unit (in effect, “lump sum” Work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured by time in hours of actual Working time and necessary traveling time of the equipment within the limits of the Work. Special equipment ordered by the Engineer in connection with force Work account Work will be measured as agreed in the Change Order authorizing such force Work account as provided for in the Subsection titled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK of this Section.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gate, unit weight, section dimensions, etc., such identification shall be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales for weighing Materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales.

Scales should be accurate within $\frac{1}{2}\%$ of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the inspector before beginning Work and at such times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or detail and shall not exceed $\frac{1}{10}$ of $1\%$ of the nominal rated capacity of the scale, but less than 1 pound. The use of spring balances shall not be permitted.

Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and inspector can safely and conveniently view them.

Scale installations shall have available, ten standard fifty-pound weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

Scales must be tested for accuracy and serviced before use at a new site. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.

Scales “overweighing” (indicating more than correct weight) will not be permitted to operate and all Materials received subsequent to the last previous correct weighing-accuracy-test will be reduced by the percentage of error in excess of $\frac{1}{2}$ of $1\%$.

In the event inspection reveals the scales have been “underweighing” (indicating less than correct weight) they shall be adjusted and no additional payment to the Contractor will be allowed for Materials previously weighed and recorded.

All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale housing; and for all other items specified in this subsection, for the weighing of Materials for portioning or payment, shall be included in the Contract Unit Prices for the various items on the Project.

When the estimated quantities for a specific portion of the Work are designed as the pay quantities in the Contract, they shall be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the plans are revised by the Engineer. If required dimensions resulting in an increase or decrease in the quantities of such Work, the final quantities from payment will be revised in the amount represented by the authorized change in the dimensions.

90.2 **SCOPE OF PAYMENT.** The Contractor shall receive and accept compensation provided for in the Contract Documents as full payment for furnishing all Materials, and for performing all Work under the Contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the Work or the prosecution thereof subject to the provisions of the Subsection titled NO WAIVER OF LEGAL RIGHTS of Section 70. Without limiting the generality of this Section, LFUCAB shall not be
liable for damages for delay, not caused in whole or in part by LFUCAB, lost profits, or other causes not within LFUCAB's control, or for any damage resulting for the act, failure to act, error or omission of any Contractor, independent architect, independent engineer, consultant, advisor or other independent contractor, providing service or Materials for the Project, or Working on or about the Airport.

When the “basis of payment” subsection of a technical specification requires that the Contract Price include compensation for certain Work or Material essential to the item, this same Work or Material will not also be measured for payment under any other contract item which may appear elsewhere in the Contract Documents.

90.3 COMPENSATION FOR ALTERED QUANTITIES. When the accepted quantities of Work vary from the quantities in the Contract Documents, the Contractor shall accept as payment in full, so far as the Contract items are concerned, the Contract Price for the accepted quantities of Work actually completed and accepted. No allowance, except as provided for in the Subsection titled ALTERATION OF WORK AND QUANTITIES of Section 40, will be made for any increased expense, loss or expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from its unbalanced allocation of overhead and profit, or from any other cause.

90.4 PAYMENT FOR OMITTED ITEMS. As specified in the Subsection OMITTED ITEMS from Section 40, the Engineer shall have the right to omit from the Work (order nonperformance) any Contract item, except major Contract items, in the best interests of LFUCAB.

Should the Engineer omit or order nonperformance of a Contract item or portion of such item from the Work, the Contractor shall accept payment in full at the Contract prices for any Work actually completed and acceptable prior to the Engineer’s order to omit or nonperform such Contract item.

Acceptable Materials ordered by the Contractor or delivered to the Project site prior to the date of the Engineer’s order will be paid for at the actual cost to the Contractor and shall thereupon become property of LFUCAB.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted Contract item prior to the date of the Engineer’s order. Such additional costs incurred by the Contractor must be directly related to the deleted Contract item and shall be supported by certified statements by the Contractor as to the nature and the amount of such costs.

90.5 PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK. Extra Work, performed in accordance with the Subsection titled EXTRA WORK of Section 40, will be paid for at the Contract Prices or agreed prices specified in the Change Order authorizing such Extra Work. When the Change Order authorizing the Extra Work requires that it is done by force account, the force account shall be measured and paid for as follows:
(a) Labor: For all labor (skilled and unskilled) and foremen in charge or a specific force account item, the Contractor shall receive the rate of wage (or scale) for every hour that such labor or foreman is actually engaged in the specified force account Work. Such wage (or scale) shall be agreed upon in writing before beginning the Work. The Contractor shall receive the actual costs paid to, or on behalf of, Workers by reasons of subsistence and travel allowances, health and welfare benefits, pension fund benefits, or other benefits, when such amounts are required by collective bargaining agreement or other employee contract generally applicable to the classes of labor employed on the Work. An amount equal to 15% of the sum of the above items will also be paid by the Contractor.

(b) Insurance and Taxes: For property damage, liability, and Workman’s compensation and any other insurance premiums required by LFUCAB and agreed to in writing, unemployment insurance contributions, and social security taxes on the force account Work, the Contractor shall receive the actual cost, to which cost (sum) 5% will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such insurance or taxes.

(c) Materials: For Materials accepted by the Engineer and used, the Contractor shall receive the actual cost of such Materials delivered on the Work, including transportation charges paid by Contractor (exclusive of machinery rentals as hereinafter set forth), to which cost (sum) 15% will be added.

(d) Equipment: For any machinery or special equipment (other than small tools) including fuel and lubricants, plus transportation costs, the use of which has been authorized by the Engineer, the Contractor shall receive the rental rates agreed upon in writing before such Work is begun for the actual time that such equipment is committed to the Work, to which a rental sum of 15% will be added.

(e) Miscellaneous: No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

(f) Comparison of Records: The Contractor and the Engineer shall compare records at the cost of force account Work at the end of each day. Agreement shall be indicated by signature of the Contractor and the Engineer or by their duly authorized representatives.

(g) Statements: No payment will be made for Work performed on a force account basis until the Contractor has furnished the Engineer with duplicated itemized statements of the cost of such force account Work detailed as follows:

1. Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman.

2. Designation, dates, total hours, daily hours, rental rates, and extension for each unit of machinery and equipment.
(3) Quantities of Materials, prices, and extensions.

(4) Transportation of Materials.

(5) Cost of property damage, liability and Worker’s compensation insurance premiums, unemployment insurance contributions, and social security tax.

Statements shall be accompanied and supported by receipted invoice for all Materials used and transportation charges. However, if Materials used on the force account Work are not specifically purchased for such Work but are taken from the Contractor’s stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such Materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

The additional payment, based on the percentages specified above, shall constitute full compensation for the items of expense not specifically provided for in the force account Work. The total payment made as provided above shall constitute full compensation for such Work.

90.6 PARTIAL PAYMENTS. Partial Progress Payments will be made thirty (30) business days after receipt of a timely properly completed, undisputed request for payment submitted to the Engineer. Each itemized Application for Payment shall be supported by each data as LFUCAB or Engineer may require, and as will substantiate the Contractor’s right to payment. Progress payments may also include, at the Contractor’s option, application for Materials stockpiled and stored in strict accordance with Subsection 90.8 PAYMENT FOR MATERIALS ON HAND.

Twenty-five (25) business days following the submission of a timely, properly completed, undisputed request for payment, the Contractor shall notify LFUCAB by certified mail if the payment has not been received. The notice shall include the date on which interest shall begin to accrue (31 business days after submission of a timely, properly completed, undisputed request for payment).

90.7 LIEN RELEASE AND RETAINAGE. Each monthly partial payment request shall be accompanied by a fully executed Subcontractor or Vendor Release of Liens and Claims for Progress Payment for each Subcontractor and/or Vendor seeking payment for the month in question.

No progress payments will be made when the amount due the Contractor since the last estimate amounts to less than five hundred ($500) dollars.

From the total amount determined to be payable on a progress payment, there shall be withheld by LFUCAB an amount equal to 10% of such total amount of any undisputed payment due as retainage until fifty percent (50%) of the construction project has been completed in accordance with the Contract Documents. The balance (90%) of the amount payable, less all previous payments, shall be certified by the Engineer to LFUCAB for payment. Such certification from the Engineer to LFUCAB shall not be made later than ten (10) business days after the Engineer
is in receipt of the Application for Payment. Upon receipt of the Certification by the Engineer, LFUCAB shall make payment in accordance with the provisions of the agreement.

After fifty-one percent (51%) of the construction project has been completed, retainage held shall not be more than five percent (5%) of the total contract amount. Within thirty (30) days after Substantial Completion, as defined in Section 50.16, LFUCAB shall release the retainage less an amount equal to two hundred percent (200%) of the Engineer and LFUCAB’s reasonably estimated cost of the balance of any contractor’s or subcontractor’s contractually obligated, yet uncompleted, work remaining. LFUCAB, Contractor and any subcontractor with work yet to be completed shall mutually agree with the schedule for completion of the Work. Final payment shall not be released until the Engineer has notified the Contractor of Final Acceptance in accordance with Section 50.18 and the conditions of Section 90.11, Final Payment, are met.

No Progress Payments on quantities of Work in excess of those provided in the proposal or covered by approved Change Orders will be allowed, except when such excess quantities have been determined by the Engineer to be a part of the final quantity for the item of the Work in question.

No Progress Payment, nor Certificate of Progress Payment, nor any partial or entire use of occupancy of the project by LFUCAB, shall constitute an acceptance of any Work or Material not in accordance with the Contract Documents. All progress payments are subject to correction at times of final payment as provided in the Subsections titled FINAL ACCEPTANCE and FINAL PAYMENT of this Section.

**90.8 PAYMENT FOR MATERIALS ON HAND.** Partial payment may be made to the extent of the delivered cost of Materials to be incorporated in the Work, provided that such Materials meet the requirements of the Contract Documents and are delivered to acceptable sites on the Airport property or at other sites in the vicinity that are acceptable to LFUCAB. Such delivered costs of stored or stockpiled Materials may be included in the next partial payment after the following conditions are met:

(a) The Materials have been stored or stockpiled in a manner so as to prevent deterioration, damage, or theft and are acceptable to the Engineer.

(b) The Contractor has furnished the Engineer with acceptable evidence of the quality and quantity or such stored or stockpiled Materials.

(c) The Contractor has furnished the Engineer with bills of sale or other such evidence that the Material and transportation costs have been paid, and that LFUCAB’s right to establish title to such Materials or equipment is free of any liens or encumbrances of any kind.

(d) The Contractor has furnished LFUCAB evidence that the Material so stored or stockpiled is insured against loss or damage to or disappearance of such Materials at any time prior to being incorporated into the Work.
The Contractor warrants and guarantees that title to all Work, Materials, and equipment covered by the Application for Payment, whether incorporated into the Project or not, will pass to LFUCAB upon receipt of such payment by the Contractor, free and clear of all liens, claims, security interests, and encumbrances. Further, no payment for such stored or stockpiled Materials shall in any way relieve the Contractor of its responsibility set forth in the Contract Documents.

In no case will the amount of partial payments for Materials on hand exceed the Contract Price for such Materials or the Contract Price for the Contract item in which the Material is intended for use.

No partial payment will be made for stored or stockpiled living or perishable plant Materials.

Once a payment has been made by LFUCAB for stockpiled or stored Material, no further payments shall be applied for or made to the Contractor for moving the Material from the storage area to stockpile to the place where it is to be finally installed or utilized.

90.9 FINAL ACCEPTANCE. When the Contract Work has been accepted in accordance with the requirements of the Subsection titled FINAL INSPECTION of Section 50.18, the Engineer will prepare the final estimate of the items of Work actually performed. The Contractor shall approve the Engineer’s final estimate or advise the Engineer of its objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the Contract as amended by Change Order. The Contractor and the Engineer shall resolve all disputes, if any, in the measurement and computation of final quantities to be paid within thirty (30) calendar days of the Contractor’s receipt of the Engineer’s final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the Engineer’s estimate under protest of the quantities in dispute and such disputed quantities shall be considered by LFUCAB as a claim in accordance with the Subsection titled CLAIMS FOR ADJUSTMENT AND DISPUTES of Section 50. Warranties shall begin to run upon Final Acceptance by LFUCAB.

After the Contractor has approved, or approved under protest, the Engineer’s final estimate, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the Contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of the Subsection titled CLAIMS FOR ADJUSTMENTS AND DISPUTES of Section 50 or under the provisions of this Subsection, such claims will be considered by LFUCAB in accordance with the Contract and local laws and ordinances. Upon final adjunction of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental, final estimate.

90.10 FINAL DRAWINGS, WAIVERS, AND WARRANTIES. Prior to the submission of the Final Payment Certification by the Engineer to LFUCAB, the Engineer shall receive from the
Contractor the final as-built drawings, final lien waivers, final payroll certifications and all warranties, guaranties, and similar documents. Failure to deliver said documents to the Engineer shall be grounds for the Engineer to withhold the Final Payment Certification, until such documents are delivered. As set in the Subsection entitled FINAL PAYMENT in this Section, all warranties shall begin to run from Final Acceptance.

All job records furnished by the Contractor as above specified shall become the property of LFUCAB

90.11 FINAL PAYMENT. Upon receipt of Written Notice from the Engineer that final inspection of the Project has been made and that all Work has been found acceptable in accordance with the Contract Documents, Contractor shall make application for final payment. Final payment shall be due within thirty (30) business days of said application, subject to the provisions herein contained. Final payment shall not be paid until the Contractor submits an affidavit, in a form approved by LFUCAB, to accompany the final payment application, affirming that there are not outstanding liens on the Project and all labor and Materials have been paid for, supported by such additional affidavits or evidence of payment as LFUCAB may reasonably require. LFUCAB may, at its option, withhold final payment until the Contractor has provided LFUCAB with a complete and unconditional release of all claims for the payment of labor, equipment or Material furnished to the Project, or receipts which evidence full payment of such claims, and Contractor shall also furnish LFUCAB an affidavit that to the Contractor's best knowledge, information and belief, said releases or payments include all labor, equipment and Materials for which a lien could be filed. Notwithstanding the foregoing, the Contractor and Surety shall continue to be liable for any such claims or liens, including, but not limited to, all guarantees and warranties, which may be asserted or which may be unsatisfied after all payments are made by LFUCAB to the Contractor.

The making of the final payment by LFUCAB shall constitute a waiver of all claims by LFUCAB, other than claims arising from faulty of defective Work which appears or becomes known to LFUCAB after such final payment, and unsettled or unasserted claims against LFUCAB or the Project, indemnification claims and/or warranty and guarantee claims. Likewise, acceptance of final payment by the Contractor and any Subcontractors shall constitute a waiver of all claims by the Contractor and any Subcontractors against LFUCAB, and the Contractor and all subcontractors each hereby agree to indemnify and hold LFUCAB harmless from and against any such unsettled or unasserted claim.

END OF SECTION 90
SPECIAL CONDITIONS
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY
BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

1. SCOPE OF WORK.

2,000 square foot General Aviation Facility renovation of an existing customs facility inside an existing storage / shipping building and other Work indicated in the Contract Documents.

2. CONTRACT TIME.

The Contract Time shall be 150 Calendar Days from the Notice to Proceed. The Notice to Proceed shall state the date on which the Contractor Time shall begin to run.

The Contract Time includes the time required for any and all delivery of Equipment and Materials.

3. LIQUIDATED DAMAGES.

In accordance with the General Conditions, Liquidated Damages will be assessed if the Contractor fails to complete the Work within the Contract Time. The Contractor agrees that this sum is an agreed to amount, arrived at due to the difficulty in determining actual costs to LFUCAB for Contractor’s delay, and not as a penalty. The agreed amount of Liquidated Damages is $500.00 per Calendar Day.

4. SCHEDULE OF WORK.

Within ten (10) days after the award of the Contract, the Contractor shall submit a detailed schedule, in the form specified in the General Conditions, to LFUCAB for review.

5. PRECONSTRUCTION CONFERENCE.

A Preconstruction Conference will be held on November 2, 2017, at the offices of Planning and Development, Blue Grass Airport, Lexington, Kentucky. Contractor’s project manager, superintendent and subcontractors’ representatives shall attend this meeting.

6. PERMITS.

The Contractor shall be responsible for obtaining all necessary permits from the appropriate agencies relating to this Contractor.
7. **REMOVED ITEMS.**

All salvageable items removed from the site shall remain the property of LFUCAB. The Engineer shall direct the Contractor as to the proper destination of the removed items.

8. **CONTRACTOR’S STAGING AREA.**

The Contractor shall be assigned staging areas as designated on the Safety Plans. Materials, equipment and tools remaining at the Airport overnight shall be moved to these locations. Employees’ vehicles will be parked in this area as well. The Contractor shall keep equipment and Materials off the existing roads and parking areas, and shall keep the existing taxiways and aprons clear.

9. **PROGRESS MEETINGS.**

Construction Progress Meetings shall be held on site (provide tables and chairs for 10 persons) bi-weekly at the offices of Planning and Development, Blue Grass Airport, Lexington, Kentucky. Contractor shall present an updated progress schedule at the Progress Meetings. The Engineer, representatives of LFUCAB, Contractor and Subcontractors shall attend these meetings.

10. **SAFETY REQUIREMENTS/SAFETY PLAN.**

Contractor shall provide LFUCAB a copy of its site-specific Safety Plan that conforms to LFUCAB’s Safety Requirements. Contractor shall remain solely responsible for safety on the Project, and LFUCAB shall have no responsibility for such Safety Plan.

11. **WARRANTIES.**

Contractor shall warrant the project for 12 months after established date of substantial completion in addition to special warranty requirements as outlined in the technical specifications and contract documents. If any portion of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition.

12. **INSURANCE REQUIREMENTS.**

General Liability Limits - $1,000,000 per Occurrence / $2,000,000 Aggregate.

Automobile Liability Limits - $1,000,000

Worker’s Compensation Limits - $500,000 / $500,000 / $500,000

Umbrella Limits (no less) - $10,000,000
The Blue Grass Airport shall be named as an Additional Insured on the successful bidders liability policies for the duration of the construction process.

13. **FIELD OFFICE.**

Contractor shall maintain a field office on the Project Site at a location to be discussed and approved at the Preconstruction Conference. Contractor shall provide LFUCAB and Engineer reasonable access to the field office, and shall keep the area around the field office broom clean and free of litter and debris.

14. **TEXT MESSAGING WHILE DRIVING.**

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10 “Text Messaging While Driving” (12/30/2009), FAA encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or sub-grant.

The Contractor must promote policies and initiatives for employees and other work personnel that decrease crashes by distracted drivers, including policies to ban text messaging while driving. The Contractor must include these policies in each third party subcontract involved on this project.

15. **CONSTRUCTION SIGNAGE.** (NOT USED)

16. **SOILS INVESTIGATION.** (NOT USED)

17. **EXISTING PAVEMENT.**

It shall be the responsibility of the Contractor to verify all elevations where new construction is to match existing pavement. The Contractor shall take all necessary precautions to protect and safeguard the existing pavement surfaces from damages due to Contractor’s operations. Crawler-type equipment on pavement to remain in place will not be permitted, and the operation of overweight and oversized equipment shall be governed by federal, state and local laws and regulations. Any damaged portions of the pavement, surface and/or surface removed in excess of that required by the Contract Documents, shall be promptly replaced or repaired by the Contractor at its own expense to the satisfaction of LFUCAB.
INVITATION TO BID

BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

Sealed Bids shall be received at the Engineering Office, Blue Grass Airport, 4000 Terminal Drive, Suite 206, Lexington, Kentucky 40510, until and not later than 2:00 p.m. local time on November 16, 2017. Immediately following such deadline, all Bids will be publicly opened and read at the Blue Grass Airport, Board Office for the following project:

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
(hereinafter "the Project")

The Project shall consist of 2,000 square foot General Aviation Facility renovation of an existing customs facility inside an existing storage/shipping building and other Work indicated in the Contract Documents.

Contract Documents, including Plans and Specifications, may be purchased at lynnimaging.com.

Each sealed Bid shall be accompanied by an irrevocable Bank Letter of Credit, or satisfactory Bid Bond (attachment #8) with good corporate surety, in a sum not less than ten percent (10%) of the aggregate amount of the Bid, payable without condition to LFUCAB, to guarantee that if Bidder’s offer results in an Award, the Bidder will furnish all required bonds, insurance certificate(s) and insurance policy(ies) within ten Calendar Days after the date Notice of Award is given, and enter into the Contract within thirty (30) days after Notice of Award is given.

LFUCAB, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat., 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally Assisted Programs of the Department of Transportation issued pursuant to such Act, hereby notifies all Bidders that it will affirmatively insure that in any Award made pursuant to this advertisement, Disadvantaged Business Enterprises will be afforded full opportunity to submit Bids in response to this invitation and that no Bidder will be discriminated against on the grounds of race, color, religion, sex or national origin in consideration for an Award.

LFUCAB reserves the right to waive any informality in any Bid or Bid Guaranty, to reject any and all Bids and to negotiate with any Bidder to such extent as may be necessary.
LFUCAB will conduct a Pre-Bid Conference beginning at 1:00 p.m. local time on November 2, 2017 for the purpose of reviewing the Contract Documents. The Pre-Bid Conference will be held at the Blue Grass Airport, Board Office, Lexington, Kentucky. All prospective Bidders are invited and encouraged to attend this conference.

Any questions from the prospective Bidders will be accepted in writing until four days prior to the bid opening date. After this date, no questions will be answered. These questions must be emailed to jsills@scbarchitects.com. All questions must be submitted on the Bid Question Form (See attachment #7). LFUCAB will not be liable for oral responses to oral questions of Bidders; Bidders shall rely on such oral representations at their own risk.

By submitting a bid, Bidders waive any rights they may have to protest the selection of the best qualified bid by LFUCAB, and further waives any cause of action that it may have against the Engineer in relation to the Engineer's advice to the LFUCAB regarding the selection of the best qualified Bidder.

LFUCAB will encourage the successful Bidder to enter into, and will assist the successful Bidder in securing, a project agreement, or other agreement, to reduce the risk of work stoppages or other labor related delays during the term of the Project.

LFUCAB will encourage the successful Bidder to employ local labor for all but supervisory personnel for the Project.

TITLE VI SOLICITATION NOTICE. LFUCAB, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprise will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Mark J. Day
Director of Engineering and Maintenance
INSTRUCTIONS TO BIDDERS

BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

1. RECEIPT OF BIDS.

(a) LFUCAB invites Bids on the Bid Proposal Form provided. All blanks must be appropriately completed. Bids will be received in the office of Engineering, Blue Grass Airport, Lexington, Kentucky, until 2:00 p.m., local time on the sixteenth day of November 2017.

(b) Any Bid Proposal Form received after the above set forth time and date will be returned unopened.

(c) Each Bid shall be enclosed in a sealed envelope, the outside of which shall indicate:

(i) The name of the Project;

(ii) The name of the Bidder;

(iii) The Project number;

(iv) Bid bond, Certified Check, Bank Letter of Credit.

Any Bid Proposal received which does not comply with these provisions will be returned unopened.

2. PROJECT.

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION

3. NOT USED.

4. PROPOSAL PREPARATION. Bidder shall consult and review fully the Bid Conditions and General Conditions for additional information relating to the preparation of the Proposal.
5. **CONTRACT REQUIREMENTS.** Bidder shall also consult the General Conditions regarding the requirements of the successful Bidder regarding the time limitations of the Work, Bonding requirements, Progress Schedule and the requirements of the Contract.

6. **DBE PROGRAM.** Bidder shall review the Contract Documents and Bid Conditions thoroughly to ascertain the DBE Program compliance requirements.

7. **AWARD OF THE CONTRACT.** Award of the Contract shall be made in accordance with the terms of the Contract Documents herein, to the “responsive and responsible” Bidder with the lowest total Bid amount as determined by LFUCAB in its sole discretion.

8. **BIDS NOT WITHDRAWN.** No Bid shall be withdrawn for a period of ninety (90) Calendar Days after the time scheduled for the Bid Opening without the prior written consent of LFUCAB. Should the Contract not be awarded within the specified period, the time may be extended by mutual written agreement of the Owner and Bidder.

**END OF INSTRUCTIONS TO BIDDERS**
1. **BIDDER’S DECLARATIONS.**

The undersigned hereby declares that the only persons having an interest in this Bid, as principals, are those named herein. The undersigned further declares, as a qualified Bidder, that the site of the proposed Project has been examined, all of the Contract Documents have been read and understood, and that the Bidder agrees it can, and will, conform to all of the Plans, General and Special Conditions and Technical Specifications therein contained, and can, and will, carry out and complete this Project pursuant to the Contract Documents. In the event that this Bid is accepted by LFUCAB, the undersigned agrees to furnish all required bonds, insurance certificates and other documents within fourteen (14) Calendar Days after the date the Notice of Award is given by LFUCAB. Furthermore, if it is the successful Bidder, the undersigned agrees to enter into a contract in the form contained in these Contract Documents within thirty (30) Calendar Days after the date that a Notice of Award is given to such successful Bidder. If it is the successful Bidder, the undersigned agrees to complete all Work described in these Contract Documents required to complete the Project for which the Contract is awarded within ____ Calendar Days from the commencement date set forth in the Notice to Proceed. The Contract Price includes the furnishing of all Labor, Materials, Tools and Equipment and doing all the Work involved in the various portions of the Project as specified in these Contract Documents, or as directed by the LFUCAB or its authorized agents, and upon the terms and conditions and in the manner set forth in these Contract Documents, under penalty of the Bond hereto attached, and to the full satisfaction and acceptance of LFUCAB.

The Undersigned affirms that neither Bidder nor any of its officers, partners, agents, representatives, employees or parties in interest, has in any way, directly or indirectly, entered into any combination, collusion, undertaking, conspiracy, or agreement with any other Bidder or Bidders to maintain the prices of said Work, or any compact to prevent any other Bidder or Bidders from bidding on said Contract or Work, nor has Bidder paid or agreed to pay directly or indirectly any person, firm, corporation or other Bidder any money or valuable consideration for attempting to fix the prices in the attached Bid or the Bid of any Bidder, and further states that no such money or other reward will be hereinafter paid.

2. **BID.**

The undersigned, having inspected the areas involved and being familiar with all conditions likely to be encountered affecting the cost and scheduling of the Work, and having examined all of the Contract Documents, hereby proposes to furnish all Labor, Materials, Tools, Equipment and Services required to perform all Work in strict accordance with the Contract Documents as
prepared by LFUCAB for the Blue Grass Airport Customs Facility Renovation (project name) within 150 Calendar Days from the commencement date set forth in the Notice to Proceed, for the Contract Price of ______________ Dollars [($____________)].

The Bidder has checked carefully all of the figures on the attached Bid Schedule and understands and agrees that LFUCAB will not be responsible for any errors or omissions on the part of the Bidder in making up its Bid.

3. **BID SURETY.**

Enclosed herewith is an irrevocable Bank Letter of Credit, Bid Bond or Certified Check (delete inapplicable provision) in the amount of [_______________] Dollars [($____________)], being ten percent (10%) of the proposed Contract Price stated above, which is to be forfeited if, in the event this Bid is accepted, the undersigned Bidder shall fail to execute the Contract and furnish satisfactory evidence of insurance and Performance and Payment Bonds under the Conditions and within the time specified hereinafter, otherwise the sum will be returned to the Bidder.

4. **CONDITIONS OF BID.**

(a) Bidder understands and agrees that the LFUCAB reserves the right to waive irregularities, technicalities and informalities, and the right to reject any and all Bids, and to negotiate with the apparent responsive and responsible low Bidder if necessary.

Bidder further acknowledges and agrees that it will begin operations within fourteen (14) days after the Notice to Proceed, and the Work shall be completed within 150 Calendar Days from the date of the Notice to Proceed.

(b) Bidder also agrees that if it fails to complete the Work within the Contract Time, it will be assessed Liquidated Damages in the amount of $500.00 per Calendar Day until the date of Substantial Completion is achieved as defined in Section 10 of the General Conditions, and thereafter in the amount of $250.00 per Calendar Day until the date that Final Completion and Final Acceptance of the Contract is achieved as defined in Section 10 (Final Acceptance). Bidder agrees that LFUCAB may deduct the Liquidated Damages from retained funds and/or Contract balances, if available, by unilateral Change Order.

(c) Bidder warrants that it has carefully examined the Bid Package, including the Bid Form, General Conditions, Special Conditions, Technical Specifications and Attachments. Bidder further warrants that it has considered all conditions and circumstances relating to the Bid. Bidders are responsible for making technical inquiries; failure of Bidder to make such examination and inquiry shall not relieve Bidder of this warranty.
5. **JURISDICTION.**

The Bidder agrees that any legal action, suit or proceeding under, relating to or arising out of or in connection with this Bid or any Contract that may be awarded to the Bidder, or any breach of any of the foregoing, may be brought exclusively in the United States District Court for the Eastern District of Kentucky or in the state courts of the Commonwealth of Kentucky, and by execution and delivery of this Bid, the Bidder irrevocably accepts, consents and submits to the jurisdiction of the aforesaid courts in personam, generally and unconditionally, with respect to any such action, suit or proceeding involving the Bidder. The Bidder further irrevocably consents and agrees to the service of any and all legal process, summons, notices and documents out of any of the aforesaid courts in any such action, suit or proceeding by mailing copies thereof by registered or certified mail, postage prepaid, to the Bidder at the address set forth in this Bid. In addition, the Bidder irrevocably and unconditionally waives any objection which the Bidder may now or hereafter have to the laying of venue of any of the aforesaid claims, suits or proceedings brought in any of the aforesaid courts, and further irrevocably and unconditionally waives and agrees not to plead or claim that any such action, suit or proceeding brought in any such court has been brought in an inconvenient forum.

6. **WAIVER**

The Bidder hereby waives any right it may have to protest the selection of the lowest responsive and responsible Bid by LFUCAB. Bidder further waives any cause of action it may have against LFUCAB and the Engineer relating to the selection of the lowest responsive and responsible Bid.

7. **CERTIFICATION OF NONSEGREGATED FACILITIES AS REQUIRED BY 41 CFR 60-1.8.**

Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause.

By the submission of this Bid, the Bidder, offerer, applicant, or subcontractor certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The Bidder, offerer, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this Contract. As used in this certification, the term “segregated facilities” means any waiting room, work areas, rest rooms or wash rooms, restaurants or other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or other entertainment areas, transportation and housing facilities provided for the employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion or national origin, because of habit, local custom, or otherwise. Bidder further agrees that, (except where he has obtained identical certification from proposed subcontractors for specific time periods) Bidder will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause, that it will retain such certifications in Bidder’s files; and that Bidder will forward the following notice to such proposed subcontractors (except...
where the proposed subcontractors have submitted identical certifications of specific time periods).

8. **LUMP SUM PROPOSAL**

The Work proposed to be performed shall be accepted when fully completed and finished to the entire satisfaction of the Lexington-Fayette Urban County Airport Board.

The Undersigned certifies, swears and affirms that the price contained in this Bid has been carefully checked and is submitted as correct and final; and further, that the Bidder’s information submitted is true and correct, and that all certifications and affirmations given or made are likewise truthful, accurate, and not made with the intent to deceive.

BID TOTAL $ ____________________________________________________ (numerical)
BID TOTAL $ ____________________________________________________ (in words)

9. **DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION**

THE FOLLOWING LIST OF DISADVANTAGED BUSINESS ENTERPRISE FIRMS IS TO BE COMPLETED AND SUBMITTED AT THE TIME THIS BID IS DUE, IN ACCORDANCE WITH PROVISIONS OF THE GENERAL CONDITIONS.

The undersigned hereby attests that [___] percent [(___%)] of the Bid Price of the Project shall be awarded to and performed by certified Disadvantaged Business Enterprises, [___] percent [(___%)] of which are minority owned DBE’s and [___] percent [(___%)] of which are female owned DBE’s as follows:

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<tr>
<th>DISADVANTAGED SUBCONTRACTORS</th>
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<td>DBE Subcontractor Names and Addresses</td>
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Total Dollar Value of Subcontract Work
Total Dollar Value of Base Bid
Percent of Total
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________________
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Percent of Total
________________%
10. **LIST OF PROPOSED SUBCONTRACTORS.**

THE FOLLOWING LIST OF PROPOSED SUBCONTRACTORS IS TO BE COMPLETELY EXECUTED AND SUBMITTED AT THE TIME THE BID IS DUE FOR ALL SUBCONTRACTORS PROPOSED TO PERFORM 5% OR MORE OF THE TOTAL CONTRACT PRICE.

All subcontractors are subject to the approval of LFUCAB.

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<th>SUBCONTRACTOR</th>
<th>PERCENT OF TOTAL CONTRACT</th>
<th>DESCRIPTION OF WORK TO BE SUBLET</th>
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11. **BID ADDENDA.**

Bidder hereby acknowledges receipt of, and is familiar with the contents of, the following Addenda:

Addendum No. __________  Dated ____________  No. of Pages ____
Addendum No. __________  Dated ____________  No. of Pages ____
Addendum No. __________  Dated ____________  No. of Pages ____
Addendum No. __________  Dated ____________  No. of Pages ____
12. **NO SOLICITATION FEE.**

The Bidder further states that no person or selling agency has been employed or retained to solicit or secure the Contract for a fee, except bona fide employees of the Bidder or bona fide commercial or selling agency maintained by the Bidder for the purpose of securing business.

13. **NO UNDISCLOSED RECOMMENDATIONS.**

The Bidder further states that it has neither recommended nor suggested to LFUCAB, or any of its members, officers, or employees, any of the terms or provisions set forth in the Contract Documents, except at a meeting open to all interested Bidders, of which proper notice was given.

14. **NO RELATIONSHIP TO LFUCAB.**

The Bidder further states that no officer or stockholder of the Bidder is a member of the LFUCAB or its staff, or related to any members of the LFUCAB or its staff except as noted herein below:

_____________________________________________________________________________

_____________________________________________________________________________

_____________________________________________________________________________

15. **NO BENEFIT TO PUBLIC OFFICIALS.**

The Bidder further states that no member of or delegate to Congress or state or local public official shall be admitted to any share or part of the Contract or to any benefit that may arise therefrom; provided, however, this provision shall not be construed to extend to the Contract if made with a corporation for its general benefit.

16. **BREACH.**

The Bidder understands and agrees that for breach or violation of any of the covenants expressed in the Bid Form, the LFUCAB shall have the right to declare Bidder not eligible for Award of the Contract, if such breach or violation becomes known prior to Award or, if such breach or violation becomes known after Award, to void the Contract without liability; or in its discretion to deduct from the Contract Price, or otherwise recover, the full amounts paid in violation of these covenants, or the value of participation in violation of these covenants.
ATTEST: ________________________________

______________________________

BIDDER: ________________________________

(Company Name)

By: ________________________________

Its: ________________________________

ADDRESS OF BIDDER:

____________________________________

____________________________________

____________________________________

PHONE NUMBER: ______________________

FAX NUMBER: _________________________
BID CONDITIONS

BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION

PROJECT NAME

B.G.A. PROJECT NO. 1205

DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

The following Bid Conditions apply to this Contract. Submission of a Bid by a Bidder shall constitute acceptance of these Bid Conditions.

1. DEFINITION. Disadvantaged Business Enterprise (DBE) as used in these Contract Documents shall have the same meaning as 49 CFR Part 26.5. For purposes of LFUCAB’s DBE Program, “DBE” shall mean a for profit small business concern:

   (a) That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged, or in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and

   (b) Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

2. POLICY. The Lexington-Fayette Urban County Airport Board (“LFUCAB”) shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its Disadvantaged Business Enterprise Program (“DBE Program”) or the requirements in 49 CFR Part 26. The recipient shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The LFUCAB’s DBE Program, as required by 49 CFR Part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this DBE Program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the LFUCAB of its failure to carry out its approved DBE Program, the DOT may impose sanctions as provided for under Part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 et seq.).

3. DBE OBLIGATION. The Contractor, sub recipient 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 CFR 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 LFUCAB deems appropriate.
4. **RECORDS.** Successful Bidder shall be required to maintain records and documents of payments made to DBE’s for three years following completion of the Contract. These records will be made available for inspection upon request of any authorized representative of LFUCAB or the FAA. The DBE’s shall likewise be bound to maintain such records.

5. **COMPLIANCE.** All Bidders, potential Contractors, and Subcontractors for this DOT-assisted Contract are hereby notified that failure to carry out the DOT policy and the DBE obligations, as set forth above, shall constitute a material breach of contract which may result in termination of the Contract, or such other remedy as deemed appropriate by LFUCAB and permitted under this Contract, at law or in equity.

6. **SUBCONTRACT CLAUSE.** All Bidders and potential Contractors hereby assure that they will include the above clauses in all subcontracts which offer further subcontracting opportunities.

7. **CONTRACT AWARD.** Bidders are hereby advised that meeting DBE Subcontract goals or making an acceptable good faith effort to meet such goals are conditions of being awarded this DOT assigned contract.

LFUCAB proposes to award the Contract to the lowest responsive and responsible Bidder submitting a reasonable Bid provided it has met the goals of DBE participation or, if failing to meet the goals, he has made an acceptable good faith effort to meet the established goals for DBE participation.

Bidder is advised that LFUCAB has sole authority to determine if the Bidder has made sufficient effort towards meeting DBE goals to qualify for contract award. LFUCAB reserves the right to reject any or all bids submitted.

8. **DBE PARTICIPATION GOALS.** The Bidder shall make good faith efforts, as defined in Appendix A of 49 CFR Part 26, regulations to the Office of the Secretary of Transportation, to subcontract _________________zero (minimum) (0) percent of the dollar value of the prime contract to small business concerns owned and controlled by socially and economically disadvantaged individuals (DBE). In the event that the bidder for this solicitation qualifies as a DBE, the contract goal shall be deemed to have been met. Individuals who are rebuttably presumed to be socially and economically disadvantaged include women, Blacks, Hispanics, Native Americans, -Asian-Pacific Americans and Asian-Indian Americans. The apparent successful competitor will be required to submit information concerning the DBE’s that will participate in this Contract. The information will include the name and address of each DBE, a description of the work to be performed by each named firm, and the dollar value of the contract. The Bidder shall also submit a written statement that attests its commitment to use the identified DBE firms to meet LFUCAB’s DBE project goal. If the Bidder fails to achieve the Contract goal stated herein, it will be required to provide documentation demonstrating that it made good faith efforts in attempting to do so, as described in appendix A to 49 CFR Part 26. A Bid that fails to meet these requirements will be considered nonresponsive.
9. **CONTRACTOR’S REQUIRED SUBMISSION.** LFUCAB requires the submission of
the following information with the bid. Certain other DBE information may also be required.

**DISADVANTAGED BUSINESS ENTERPRISE SUBCONTRACTORS**

<table>
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<tr>
<th>Minority Subcontractors Names and Addresses</th>
<th>Subcontract Work Item</th>
<th>Dollar Value Subcontract Work</th>
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Total Dollar Value of Subcontract Work: ____________________________
Total Dollar Value of Basic Bid: ____________________________
Percent of Total: ____________________________ %

If the Bidder fails to meet the Contract goals established in Paragraph 7 above, the following
information must be submitted prior to Contract Award to assist LFUCAB in determining
whether or not the Bidder made acceptable good faith efforts to meet the Contract goals. This
information (when applicable), as well as the DBE information, should be submitted as specified
in paragraph 9 above.

Suggested guidance for use in determining if good faith efforts were made by the Bidder are
included in Appendix A to 49 CFR Part 26. The factors relating to DBE participation are set
forth in Appendix B.

A list of the efforts that a Bidder may make and LFUCAB may use in making a determination as
to the acceptability of a Bidder’s efforts to meet the goals as included in Appendix A are as
follows:
(a) Whether the Bidder attended any pre-solicitation or pre-bid meetings that were scheduled by the recipient to inform DBE’s of contracting and subcontracting opportunities;

(b) Whether the Bidder advertised in general circulation, trade association, and minority-focus media concerning the subcontracting opportunities;

(c) Whether the Bidder provided written notice to a reasonable number of specific DBE’s that their interest in the contract was being solicited, in sufficient time to allow the DBE’s to participate effectively;

(d) Whether the Bidder followed up initial solicitations of interest by contracting DBE’s to determine with certainty whether the DBE’s were interested;

(e) Whether the Bidder selected portions of work to be performed by the DBE’s in order to increase the likelihood of meeting the DBE goals (including, where appropriate, breaking down contracts into economically feasible units to facilitate DBE participation);

(f) Whether the Bidder provided interested DBE’s with adequate information about the plans, specifications, and requirements of the Contract;

(g) Whether the Bidder negotiated in good faith with interested DBE’s, not rejecting DBE’s as unqualified without sound reasons based on a thorough investigation of their capabilities;

(h) Whether the Bidder made efforts to assist interested DBE’s in obtaining bonding, lines of credit, or insurance required by the recipient or Bidder; and

(i) Whether the Bidder effectively used the services of available disadvantaged community organizations; disadvantaged contractors’ groups; local, state and federal disadvantaged business assistance offices; and other organizations that provide assistance in the recruitment and placement of DBE’s.

NOTE: The nine (9) items set forth above (items (a) through (i)) are merely suggested criteria and LFUCAB may specify that you submit information on certain other actions a Bidder has taken to secure DBE participation in an effort to meet the goals. A Bidder may also submit to LFUCAB other information on its efforts to meet the goals.

10. CONTRACTOR ASSURANCE. The Bidder hereby assures that it will meet one of the following as appropriate:

(a) The DBE participation goals as established in paragraph 7 above.

(b) The DBE Participation percentage as shown in paragraph 9 which was submitted as a condition of contract award.

Agreements between Bidder and DBE in which the DBE promises not to provide subcontracting quotations to other bidders/proposers are prohibited. The Bidder shall make a good faith effort
to replace a DBE Subcontract that is unable to perform successfully with another DBE Subcontractor. Substitution must be coordinated and approved by LFUCAB.

The Bidder shall establish and maintain records and submit regular reports, as required, which will identify and assess progress in achieving DBE Subcontract goals and other DBE affirmative action efforts.

11. **PROMPT PAYMENT OF SUBCONTRACTORS.** The prime contractor agrees to pay each subcontractor under this prime Contract for satisfactory performance of its contract no later than fifteen (15) business days from the receipt of each payment the prime contractor receives from LFUCAB. The prime contractor agrees further to return retainage payments to each subcontractor within fifteen (15) business days after the subcontractor’s work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of LFUCAB. This clause applies to both DBE and non-DBE subcontractors.

   Agreements between Bidder and a DBE in which the DBE promises not to provide subcontracting quotations to other bidders/proposers are prohibited. The Bidder shall make a good faith effort to replace a DBE Subcontractor that is unable to perform successfully with another DBE Subcontractor. Substitution must be coordinated and approved by LFUCAB.

   The Bidder shall establish and maintain records and submit regular reports, as required, which will identify and assess progress in achieving DBE Subcontract goals and other DBE affirmative action efforts.
BIDDER'S EXPERIENCE AND QUALIFICATIONS
QUESTIONNAIRE
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY
BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

The following information (Page Q-1 through Q-8) must be completed and submitted with the Bid.

The Bidder hereby certifies the truth and correctness of all statements and of all answers to questions herein. Omissions, inaccuracy, or misstatement may be cause for rejection of a Bid.

1. Name and address of Bidder exactly as it should appear on the Contract.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2. Address of Bidder, if different from above, for the purposes of notice or other communication relating to the Bid and Agreement. (If Bidder is other than an individual, provide the name of an individual who can answer for Bidder):

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

Telephone Number_____________________________________________________

3. Bidder intends to complete the Project with which this Bid is concerned as a Sole Proprietorship (    ); Partnership (    ); Corporation (    ); Joint Venture (    ); or LLC (    )

Explain: ________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________
*(If more space is necessary for answering any of the questions in this questionnaire, use the reverse side of the pertinent page if additional sheets are required.)
CORPORATION STATEMENT

If a corporation, answer the following:

1. When incorporated? ____________________________

2. Where incorporated? __________________________

3. Is the corporation authorized to do business in Kentucky?
   
   Yes ( )   No ( )

   If so, as of what date?

4. Is the corporation an L.L.C.?

5. Furnish the following information on the principal officers of the corporation.

   Name   Title   Address

   ________________________________
   ________________________________
   ________________________________

PARTNERSHIP STATEMENT

If a partnership, answer the following:

1. Date of Organization

2. General Partnership ( )   Limited Partnership ( )

3. Has the partnership done business in Kentucky?

4. Name and address of each general partner:

   Name   Address

   ________________________________
   ________________________________
   ________________________________
   ________________________________
JOINT VENTURE STATEMENT

If a joint venture, answer the following:

1. Date of Organization___________________

2. Has the Joint Venture done business in Kentucky?
   Yes (   )  No (   )

3. Name and address of each Joint Venturer:
   Name                        Address
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

SOLE PROPRIETORSHIP

If Sole Proprietorship, furnish the following:

Proprietor's Name in full________________________________________

Address________________________________________________________

Company Name____________________________________________________

Company Address___________________________________________________

How long in business under this Company Name?________________________
STATEMENT OF QUALIFICATION AND EXPERIENCE

1. How many years experience in the type of work associated with the proposed Project has your organization had?
   (a) as a general contractor______________   (b) as a subcontractor______________

2. List of related experience of the principal individuals of your organization:
   ___________________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________

3. For what Federal or State bureau or department have you performed work and to whom do you refer? Provide the name and phone number of the reference.
   ___________________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________

4. Has the Bidder or any officer or partner of the Bidder's firm ever failed to complete any work or projects awarded, or been an officer or partner of some other organization that failed to complete any work or projects awarded? ____________________________

   If so, state name of individual, name of firm which defaulted and its principal owner(s) and the date and reasons therefore.
   ___________________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________
5. List name of projects, owners, contract amount, percent complete, and scheduled completion of the similar major projects your organization has in process on the date of this Bid. Provide name and phone number of contact person for reference.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

6. List name of projects, owners, and scheduled completion of the similar major projects currently being bid by your organization on the date of this Bid. Estimate value of each in $50,000 increments.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

7. List the name of project, owner, contract amount, date of completion and percent of work with own forces of the similar major projects your organization has completed in the past five years:

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

8. Trade references: ___________________________________________________________

___________________________________________________________________________
___________________________________________________________________________

9. Other information Bidder may wish to furnish:____________________________________

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
OPERATING PROCEDURES WHICH BIDDER PROPOSES TO FOLLOW FOR THIS PROJECT

1. Explain in detail the manner in which you have inspected the proposed Project prior to submitting this Bid.

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

2. Explain the procedures planned for performing the Project:

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

3. Describe major equipment you own that is available for this proposed work:

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<th>CAPACITY, ETC.</th>
<th>CONDITION</th>
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4. Describe major equipment you intend to purchase for the proposed Project, if the Contract is awarded to you:

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<th>CAPACITY, ETC.</th>
<th>CONDITION</th>
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5. How and when will you pay for the equipment to be purchased?

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________
6. Do you propose to rent or lease any major equipment for this work? _________________

If so, state type, quantity and reasons for renting:

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________
BIDDER'S FINANCIAL INFORMATION

1. FINANCIAL STATEMENTS

Please attach copies of your current (or most recent) BALANCE SHEET and INCOME STATEMENT prepared in accordance with good accounting practice, reflecting your current financial condition in addition to a copy of your last annual report certified by an independent certified public accountant who is not a regular employee of the bidder. This information will be held in strict confidence.

2. LIST BANK REFERENCES (include telephone number and account representative). State also whether any of the financial institutions are DBE financial institutions.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

3. SURETY INFORMATION

Have you ever had a bond or surety canceled or forfeited?

Yes ( ) No ( )

If yes, state name of bonding company, date, amount of bond and reason for such cancellation or forfeiture.

___________________________________________________________________________
___________________________________________________________________________

4. BANKRUPTCY INFORMATION

Have you ever been declared bankrupt? Yes ( ) No ( )

If yes, state date, court jurisdiction, amount of liabilities and amount of assets.

___________________________________________________________________________
___________________________________________________________________________

___________________________________________________________________________
CONSTRUCTION CONTRACT
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

THIS CONSTRUCTION AGREEMENT, hereinafter “Contract”, made and entered into on this _______________ day of ________________ , 20__, by and between ___________________________________________________________________________ of ________________________________________________________________________________ hereinafter called “Contractor”, and the Lexington-Fayette Urban County Airport Board, Lexington, Kentucky, hereinafter referred to as “LFUCAB.”

WITNESSETH:

For and in consideration of the mutual covenants and agreements hereinafter contained and other valuable considerations, the Parties hereto agree, for themselves, their successors and assigns, as follows:

1. **SCOPE OF WORK.** The Contractor shall furnish all of the material and perform all of the Work necessary and required for completion of ________________ (“Project”) in accordance with and pursuant to the terms, provisions, covenants and conditions of this Contract and the Contract Documents attached hereto and made a part hereof.

2. **CONTRACT TIME.** This Project shall be fully completed no later than ________________ (____) Calendar Days from the commencement date set forth in the Notice to Proceed, except to the extent that the Contract Time may be extended in accordance with the Contract Documents.

3. **CONTRACT PRICE.** LFUCAB shall pay the Contractor for the completion of this Contract, subject to any additions and deductions provided for herein, an amount equal to the product of:

   (a) the unit prices set forth in ________________ of the Bid Form submitted by the Contractor on ______________________, _______, multiplied by

   (b) the units of Work assigned to, and performed by the Contractor, as verified and accepted by LFUCAB based upon the estimated quantities set forth in the Bid Form, the aggregate estimated Contract Price is $__________________________, as specified in the Bid Form.

   (c) or a Lump Sum Price of $______________
4. **CONTRACT DOCUMENTS.**

(a) This Contract, together with the following documents, constitute the “Contract Documents” and are attached hereto and made a part hereof:

(i) Contractor’s Bid Form
(ii) Addenda and Change Orders (if any)
(iii) Bid, Performance and Payment Bonds
(iv) General Conditions
(v) Special Conditions
(vi) Technical Specifications
(vii) Invitation to or Advertisement for Bid
(viii) Plans
(ix) Insurance Certificate(s) and Policies
(x) Contract Agreement
(xi) Notice of Award
(xii) AIP Provisions
(xiii) Attachments

(b) The above documents are to be considered as one and whatever is called for by any one of the documents shall be as binding as if called for by all.

5. **DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS.** The Contractor 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 CFR Part 26 in the award and administration of DOT-assisted contracts, including this Contract. 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 LFUCAB shall deem appropriate in accordance with this Contract.

6. **GOVERNING LAW.** This Agreement shall be governed by the laws of the Commonwealth of Kentucky. All rights and remedies available to LFUCAB hereunder shall be cumulative and in addition to all other rights and remedies granted to LFUCAB at law or in equity.
7. **ENTIRE AGREEMENT; SEVERABILITY.** This Agreement constitutes the final written expression of all the terms of this Agreement and is a complete and exclusive statement of those terms. Any modifications or amendments hereof must be in writing and signed by the parties hereto. If any of the terms of this Agreement shall be finally declared invalid in a court of competent jurisdiction, all other terms shall remain in full force and effect.

8. **LEGAL ACTION.** The Contractor agrees that any legal action, suit or proceeding under, relating to or arising out of or in connection with this Contract or any breach thereof may be brought exclusively in the United States District court for the Eastern District of Kentucky or in the state courts of the Commonwealth of Kentucky and, by execution and delivery of this Contract, the Contractor irrevocably accepts, consents and submits to the jurisdiction of the aforesaid courts in personam generally and unconditionally with respect to any such action, suit or proceeding involving the Contractor. The Contractor further irrevocably consents and agrees to the service of any and all legal process, summons, notices and documents out of any of the aforesaid courts in any such action, suit or proceeding by mailing copies thereof by registered or certified mail, postage prepaid, to the Contractor at the address set forth in the Contractor’s Bid. In addition, the Contractor irrevocably and unconditionally waives any objection which the Contractor may now or hereafter have to the laying of venue of any of the aforesaid claims, suits or proceedings brought in any of the aforesaid courts, and further irrevocably and unconditionally waives and agrees not to plead or claim that any such action, suit or proceeding brought in any such court has been brought in an inconvenient forum.

9. **ENERGY CONSERVATION REQUIREMENTS.** The contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163)

10. **TERMINATION OF CONTRACT.**

   (a) Any violation or breach of terms of this contract on the part of the Contractor or their subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

   (b) LFUCAB may, by written notice, terminate this contract in whole or in part at any time, either for LFUCAB’s convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to LFUCAB. Further, Contractor shall: (1) terminate all subcontracts to the extent they relate to the work terminated under the notice; (2) discontinue all orders for materials and services except as directed by the written notice; (3) deliver to LFUCAB all fabricated and partially fabricated parts, completed and
partially completed work, supplies, equipment, and materials acquired prior to termination of the work and as directed in the written notice; (4) complete performance of the work not terminated in the notice; and (5) take action as directed by LFUCAB to protect and preserve property and work related to this Contract of which LFUCAB will take possession.

(c) If the termination is for the convenience of LFUCAB, an equitable adjustment in the Contract Price shall be made, but no amount shall be allowed for anticipated profit on unperformed services or other damages.

(d) If the termination is due to failure to fulfill the Contractor’s obligations, LFUCAB may take over the work and prosecute the same to completion by contract or otherwise. In such case, the Contractor shall be liable to LFUCAB for any additional cost, fees, expenses occasioned to LFUCAB thereby.

(e) If, after notice of termination for failure to fulfill contract obligations, it is determined that the Contractor had not so failed, the termination shall be deemed to have been effected for the convenience of LFUCAB. In such event, adjustment in the Contract Price shall be made as provided in paragraph (c) of this clause.

(f) The rights and remedies of the sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

11. **DRUG FREE WORKPLACE.**

The contractor certifies that it will or will continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about:

(1) The dangers of drug abuse in the workplace;

(2) The contractor's policy of maintaining a drug-free workplace;

(3) Any available drug counseling, rehabilitation, and employee assistance programs; and

(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will --

(1) Abide by the terms of the statement; and

(2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(e) Notifying the agency in writing, within ten calendar days after receiving notice under paragraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (d)(2), with respect to any employee who is so convicted --

(1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

12. **FEDERAL LAW.** Contractor certifies that it has read and understood all requirements of federal law imposed by the Federal Aviation Administration on Contractor and restated in Exhibit A, which is attached hereto and incorporated into this Contract as if fully restated herein.
IN WITNESS WHEREOF, the parties hereto executed this Contract on the day and year first above written.

WITNESS: LEXINGTON-FAYETTE URBAN COUNTY AIRPORT BOARD

__________________________________ BY: ________________________________

TITLE: Executive Director

WITNESS: CONTRACTOR (JOINT VENTURE)

_____________________________ BY: ________________________________

Title: ________________________________

WITNESS: CONTRACTOR (JOINT VENTURE)

_____________________________ BY: ________________________________

Title: ________________________________

APPROVED FOR LEGAL FORM:

BY: ________________________________

_____________________________

Printed Name

___________________________________

Date ________________________________
CERTIFICATIONS:

I, ______________________________, certify that I am the _______________ of the Corporation named as Contractor herein, that ______________________________ who signed this Contract on behalf of the Contractor, was then ________________ of said corporation; that said Contract was duly signed for and on behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

SEAL __________________________
Corporation

By: ______________________________________
Title: ______________________________________

I, ______________________________, certify that I am the _______________ of the Corporation named as Contractor herein, that ______________________________ who signed this Contract on behalf of the Contractor, was then ________________ of said corporation; that said Contract was duly signed for and on behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

SEAL __________________________
Corporation

By: ______________________________________
Title: ______________________________________
ACKNOWLEDGEMENTS:

STATE OF ____________________
COUNTY OF ____________________

The foregoing instrument was subscribed, sworn to and acknowledged before me this ____ day of __________________, 20__, by ________________________________ of ________________________________, on behalf of the ___________________.

________________________________________
Notary Public

My Commission Expires: ____________________

STATE OF ____________________
COUNTY OF ____________________

The foregoing instrument was subscribed, sworn to and acknowledged before me this ____ day of __________________, 20__, by ________________________________ of ________________________________, on behalf of the ___________________.

________________________________________
Notary Public

My Commission Expires: ____________________
Exhibit A

1. **Civil Rights – General.** Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision binds Contractor and subcontractors from the bid solicitation period (if applicable) through the completion of the Contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

2. **Title VI Clauses for Compliance with Nondiscrimination Requirements.** During the performance of this Contract, Contractor, for itself, its assignees and successor interest (hereinafter referred to collectively as the “Contractor” in this Section), agrees as follows:

   (a) **Compliance with Regulations.** Contractor (hereinafter includes consultants) shall comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this Contract.

   (b) **Nondiscrimination.** Contractor, with regard to the work performed by it during this Contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. Contractor shall not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when this Contract covers any activity, project, or program set forth in Appendix B of 49 C.F.R. part 21.

   (c) **Solicitations for Subcontracts, including Procurements of Materials and Equipment.** In all solicitations, either by competitive bidding, or negotiation made by Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by Contractor of Contractor’s obligations under this Contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

   (d) **Information and Reports.** Contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by LFUCAB or the FAA to be pertinent to ascertain compliance with such Nondiscrimination Acts And Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, Contractor shall so certify to LFUCAB or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.

   (e) **Sanctions for Noncompliance.** In the event of Contractor’s noncompliance with the Nondiscrimination provisions of this Contract, LFUCAB shall impose such Contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:
(i) Withholding of payments to Contractor under this Contract until Contractor complies, and/or

(ii) Cancellation, termination, or suspension of this Contract, in whole or in part.

(f) Incorporation of Provisions. Contractor shall include the provisions of paragraphs (a) through (e) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. Contractor shall take action with respect to any subcontract or procurement as LFUCAB or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, Contractor may request LFUCAB to enter into any litigation to protect LFUCAB’s interests. In addition, Contractor may request the United States to enter into the litigation to protect the interests of the United States.

3. Title VI List of Pertinent Nondiscrimination Acts and Authorities. During the performance of this Contract, Contractor, for itself, its assignees, and successors in interest (referred to collectively as the “Contractor” in this Section) agrees to comply with the following non-discrimination statutes and authorities, including but not limited to:

(g) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);

(h) 49 C.F.R. part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);

(i) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);


(k) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(l) Airport and Airway Improvement Act of 1982, (49 U.S.C. § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(m) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
(n) Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(o) The FAA’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(p) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(q) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(r) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq.).

4. **Prompt Payment to Subcontractors.** The prime contractor agrees to pay each subcontractor under this prime Contract for satisfactory performance of its contract no later than fifteen (15) business days from the receipt of each payment the prime contractor receives from LFUCAB. The prime contractor agrees further to return retainage payments to each subcontractor within fifteen (15) business days after the subcontractor’s work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of LFUCAB. This clause applies to both DBE and non-DBE subcontractors.

5. **Federal Fair Labor Standards Act.** This Contract and all subcontracts that result from the Bid incorporate by reference the provisions of 29 U.S.C. part 201, the Federal Fair Labor Standards Act (“FLSA”), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers. Contractor has full responsibility to monitor compliance with the FLSA. Contractor must address any claims or disputes that arise from this requirement directly with the US Department of Labor – Wage and Hour Division.

6. **Occupational Safety and Health Act.** This Contract and all subcontracts that result from this Bid incorporate by reference the requirements of 29 CFR Part 1910, the Occupational Safety and Health Act (“OSHA”), with the same force and effect as if given in full text. Contractor shall provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor retains full responsibility to
monitor its compliance and its subcontractors’ compliance with the applicable requirements of OSHA. Contractor must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.
CONTRACTOR’S SWORN STATEMENT
OF FINAL PAYMENT

BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

COMMONWEALTH OF KENTUCKY
COUNTY OF FAYETTE

Affiant, ________________________, being duly sworn, deposes and states that (he/she) is _________________________ of __________________________ and that (he/she) is duly authorized to make this affidavit on behalf of the Contractor and that (he/she) has first hand knowledge of the facts herein stated.

Affiant states that the Work under Contract has been fully completed, in accordance with the Contract Documents, and that all bills for labor or Materials furnished to, or used by, the Contractor in the Work have been fully paid.

Affiant states that all labor employed upon said Work has been fully paid.

Affiant further states that all subcontractors, employees and furnishers of machines, equipment, tools, materials and labor have each and all been paid in full.

Affiant further states that ________________ (name of Contractor) waives all rights it may have to any liens, claims, damages or other causes of action arising from the Work on the Project or the Contract.

All capitalized terms herein shall have the same meanings assigned to them in the Contract Documents for the Project known as ________________________________.
IN TESTIMONY WHEREOF, I have hereunto affixed my signature at Lexington, Kentucky, this _____ day of ___________________, 20_____.

____________________________________
(Affiant)

___________________________________________
Printed Name and Title

COMMONWEALTH OF KENTUCKY   )
COUNTY OF FAYETTE   )
 ) SS

The foregoing instrument was subscribed, sworn to and acknowledged before me this ___ day of __________, 20____, by ________________.

My commission expires: ________________________________

__________________________
NOTARY PUBLIC, STATE AT LARGE
WORK ALTERATION COST ANALYSIS

<table>
<thead>
<tr>
<th>DESCRIPTION OF WORK ITEMS</th>
<th>UNIT COST</th>
<th>EXTENSION</th>
<th>WORK HOURS</th>
<th>HOURLY RATE</th>
<th>TIME EXTENSION</th>
<th>RENTAL REQUIRED</th>
<th>RATE</th>
<th>EXTENSION</th>
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ATTACHMENT #2
PAGE 1 OF 2
CONSTRUCTION
SUMMARY OF WORK ALTERATION
COST ANALYSIS

PROJECT _________________________ SHEET NO. _________________________
LOCATION ______________________ QUOTATION NO ______________________
ARCHITECT ______________________ GENERAL CONTRACTOR ____________
DATE __________ PRICES BY ___________ EXTENSION BY __________
CHECKED BY __________________________________
_____________________________
1) NET MATERIAL COST ADDED (DELETED) ____________________________
2) NET LABOR COST ADDED (DELETED) ______________________________
3) NET EQUIPMENT COST ADDED (DELETED) __________________________
4) SUBTOTAL _________________________________________________
5) X 15% MARK-UP
(DELETED IF SUBTOTAL IS ZERO OR LESS) __________________________
6) TOTAL COST OF WORK ALTERATION ____________________________

ATTACHMENT #2
PAGE 2 OF 2
### DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

<table>
<thead>
<tr>
<th>1. Type of Federal Action:</th>
<th>2. Status of Federal Action:</th>
<th>3. Report Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. contract</td>
<td>a. bid/offer/application</td>
<td>a. initial filing</td>
</tr>
<tr>
<td>b. grant</td>
<td>b. initial award</td>
<td>b. material change</td>
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<tr>
<td>c. cooperative agreement</td>
<td>c. post-award</td>
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<tr>
<td>d. loan</td>
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<td>e. loan guarantee</td>
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<tr>
<td>f. loan insurance</td>
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</tbody>
</table>

For Material Change Only:
- year __________ quarter __________
- date of last report __________

<table>
<thead>
<tr>
<th>4. Name and Address of Reporting Entity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Prime               ☐ Subawardee</td>
</tr>
</tbody>
</table>

Congressional District, if known: 4c

| 5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime: |

Congressional District, if known: 4c

<table>
<thead>
<tr>
<th>6. Federal Department/Agency:</th>
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</table>

<table>
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<tr>
<th>7. Federal Program Name/Description:</th>
</tr>
</thead>
</table>

CFDA Number, if applicable: _____________

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<tr>
<th>8. Federal Action Number, if known:</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>9. Award Amount, if known:</th>
</tr>
</thead>
</table>

$  

| 10. a. Name and Address of Lobbying Registrant (if individual, last name, first name, Mi): |

| 10. b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, Mi): |

| 11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure. |

Signature: ____________________________  
Print Name: ____________________________  
Title: _________________________________  
Telephone No.: _________________________  
Date: __________

Federal Use Only:  
Authorized for Local Reproduction  
Standard Form LLL (Rev. 7-97)
INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity 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 a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, State and zip code of the lobbying registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.

(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).

11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.
AFFIDAVIT OF
SUBCONTRACTOR OF FINAL
RELEASE AND WAIVER OF LIENS AND CLAIMS

The undersigned, in consideration of the sum of ________________ to it paid by (insert Contractor name) ______________________________________________, receipt of which is hereby acknowledged, does hereby:

1. Acknowledge such sum as final payment and release the said (Contractor name) ________________ and the Lexington Fayette Urban County Airport Board from any and all claims it has for furnishing and/or supplying work, materials, machinery, fuel and/or labor in the construction of a certain project, which is (insert Project name) __________ ________________ and is located in Lexington, Kentucky; and

2. Waive all claims, liabilities, damages, causes of action and/or rights of any kind, including the right to file mechanics liens against the premises and/or Project funds related to the furnishing of and/or supplying of Work, Materials, machinery, fuel and/or labor to the same; and

3. Guarantee and warrant that all its Subcontractors, materialmen and laborers involved in this Project have been paid in full.

Dated:_________________________________

(Individual name or name of Subcontractor)

By:_________________________________

(Authorized Signature)

Title:_________________________________

COMMONWEALTH OF KENTUCKY )

COUNTY OF FAYETTE )

The foregoing instrument was subscribed, sworn to and acknowledged before me this __ day of _________, 20____, by ________________.

My commission expires:

________________________________________

NOTARY PUBLIC, STATE AT LARGE
AFFIDAVIT OF
SUBCONTRACTOR OR VENDOR FOR PARTIAL RELEASE OF LIEN
FOR PROGRESS PAYMENT

The undersigned is under Subcontract with ________________________________, (Name of Contractor) to furnish labor and/or Materials for Work at the Blue Grass Airport on the following project, (insert LFUCAB Project Title and Contract Number) ________________ ________________.

The undersigned acknowledges receipt of the previous Progress Payment number _____________, in the month of ________________, for the amount of $______________, which brings the total payment received to date $______________. The undersigned is submitting herewith a request for the Progress Payment in the amount of $______________ for the month of __________________ to (insert Contractor’s name) ________________, for payment. The undersigned, on behalf of ________________________________ (insert Subcontractor’s or Vendor’s name), and as consideration and inducement to _____________________ (Contractor’s name) to make future progress payments, hereby waives and releases any claims, causes of action, liabilities, damages, including but not limited to the right to assert a lien for all Work performed through ______________ (insert date) for payments received totaling $______________.

__________________________________________
(Printed Name of sole proprietorship, corporation or partnership)

__________________________________________
(Signature of Authorized Representative)
Title:______________________________________

COMMONWEALTH OF KENTUCKY )
) SS
COUNTY OF FAYETTE )

The foregoing instrument was subscribed, sworn to and acknowledged before me this __ day of __________, 20___, by _______________________.

My commission expires: ________________________________

__________________________________________
NOTARY PUBLIC, STATE AT LARGE
AFFIDAVIT OF
CONTRACTOR FOR PARTIAL
RELEASE OF LIENS AND CLAIMS FOR PROGRESS PAYMENT

__________________ (Contractor), in connection with the ________________ (Project Name), and under Contract with LFUCAB, has performed Work and/or furnished Materials, Equipment and/or machinery for the Project, during the period from ________________ to ________________, as set forth in Progress Payment Application No. ________________.

As inducement for LFUCAB to make future Progress Payments to Contractor, Contractor hereby warrants, swears and acknowledges that all labor, payroll taxes, Materials, Equipment, machinery, tools and/or other bills, claims, the cost or expense of which was incurred by the undersigned for this Project on or before ________________, have been paid in full. The undersigned further certifies that it has complied with all federal, state and local tax and employment laws, including but not limited to Social Security, unemployment and workers’ compensation laws, applicable to its Contract and Work on the Project through the date hereof.

The undersigned hereby waives and releases all rights to liens and/or claims against LFUCAB or the Project relating to the performance of its Work under this Contract, and further states that no other person or entity has a right to a lien or claim against LFUCAB or the Project on account of Work performed or for Material, Equipment or machinery furnished by or to Contractor through ______________ (date).

This waiver and release is made only to the extent of Work performed, or Material, equipment or machinery furnished, through ______________ (date).

__________________  
Contractor

__________________  
Signature/Title

__________________  
Printed Name/Title

__________________  
Date
COMMONWEALTH OF KENTUCKY  )
COUNTY OF FAYETTE  )
                      ) SS

The foregoing instrument was subscribed, sworn to and acknowledged before me this __
   day of _________, 20____, by ________________.

My commission expires: ________________________________

____________________________________________

NOTARY PUBLIC, STATE AT LARGE
BID QUESTIONS AND ANSWERS

FOR

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION

BLUE GRASS AIRPORT
BGA PROJECT NUMBER _______

DATE OF REQUEST: ___________

DIRECTOR OF THE DEPARTMENT
OF ENGINEERING AND MAINTENANCE
EMAIL: mday@bluegrassairport.com

QUESTION: ___________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

COMPANY: _____________________________________________________________

PERSON REQUESTING: ___________________________________________________

TELEPHONE NUMBER: ___________________________________________________

EMAIL: ________________________________________________________________

RESPONSE: ______________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

RESPONDED TO BY: _______________________________________________________

DATE OF RESPONSE _______________________________________________________

ALL QUESTIONS MUST BE SUBMITTED AND RECEIVED BY LFUCAB BY NO LATER THAN 72 HOURS PRIOR TO BID OPENING TO BE CONSIDERED FOR RESPONSE
BID BOND
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY
BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

KNOW ALL MEN BY THESE PRESENTS, that [__________________________], as Principal, and [__________________________], as Surety,
[________________________________] are hereby held and firmly bound unto the
(Surety’s mailing address)
LEXINGTON-FAYETTE URBAN COUNTY AIRPORT BOARD as OWNER (hereinafter OBLIGEE) in the penal sum of [________] Dollars [($______)] (which represents 10% of the Bid), for the payment of which we jointly and severally bind ourselves, our successors, and assigns, to enter into a contract with the Obligee and furnish all required bonds, insurance certificates and other documents, all within the times specified and otherwise in accordance with the terms of the Bid submitted to the Obligee for the purchase of
[____________________________________________________].

NOW, THEREFORE, the condition of the above obligation is such that:

If Obligee shall reject the Bid of the Principal, then the obligations hereunder shall be null and void; or,

If said BID shall be accepted as to any or all of the items, equipment, materials or workmanship proposed to be furnished thereby, or as to any portion of the same, and if the Principal shall execute and deliver the Contract provided in the Contract Documents to the Obligee, within the period specified, after the Notice of Award to furnish all items, equipment, materials and work at the bid prices, together with the specified bonds, then this obligation shall be void, otherwise, the same shall remain in force and effect.

The Surety hereby binds itself and its successor to pay the Obligee in the event that the Principal fails to enter into such Contract and to give such bonds within the specified time period set forth in the Specifications, the difference in money between the amount of the Principal’s bid as accepted, and the amount for which the Obligee may contract with others for such work, if the latter be in excess of the former, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal sum hereof. Surety agrees that it will make payment to obligation within thirty (30) days of notification of the failure of its Principal to honor its Bid.
The Surety, for valid consideration which it acknowledges having received, hereby stipulates and agrees that its obligations under this BOND shall not be released, impaired, or affected by any extension of the time within which LFUCAB may accept such BID; and Surety does hereby waive notice of any such extension.

Any such legal proceeding shall be brought in any court of competent jurisdiction, having within its geographical jurisdiction Fayette County, Kentucky and not elsewhere. By signing and executing this bond, the Principal and Surety acknowledge and consent to said jurisdiction.

IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals, the day and year first set forth above.

Signed and Sealed this __________ day of ____________________, 20__.  
___________________________(Seal)  
(Principal)  

________________________________  
(Witness)  

________________________________  
(Title of Principal)  

___________________________(Seal)  

________________________________  
(Witness)  

________________________________  
(Title of Surety)  

NOTE:  (1) Date of BOND must not be prior to date of Contract. If PRINCIPAL is Partnership, all partners should execute BOND.  
(2) A valid Power of Attorney must be attached hereto from a Kentucky agent of the Surety.  

IMPORTANT: Surety companies executing bonds must appear on the United States Treasury Department’s most current list (Circular 570 as amended) and be authorized to transact business in the Commonwealth of Kentucky. Power of Attorney of the Surety’s agent must be attached at such time as this bond is delivered to LFUCAB.
PERFORMANCE BOND
BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

KNOW ALL MEN BY THESE PRESENTS: that we, the undersigned,

[______________________________________________________________________]
(Name of Seller)

[______________________________________________________________________]
(Address of Seller)

[______________________________________________________________________]
as, Principal,

[______________________________________________________________________]
(Name of Surety)

[______________________________________________________________________]
(Address of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

[______________________________________________________________________]
(Name of Owner)

[______________________________________________________________________]
(Address of Owner)

as Obligee, hereinafter called OWNER, in the penal sum of [______________]

[_____________________] Dollars [($_________________)] in lawful money of the
United States, for payment of which the Principal and Surety bind themselves, their successors,
and assigns, jointly and severally, formally by these presents.

Whereas, the Principal, by written agreement entered into a contract with LFUCAB, dated the
[_______] day of [______________________] for the
[______________________________________________________________________].

In accordance with the drawings and specifications prepared by LFUCAB, which contract
drawings and specifications, (hereinafter referred to as “the Contract”), which are incorporated
by reference herein, NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall well, truly and faithfully perform duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract, then this obligation shall be void; otherwise to remain in full force effect.

The Surety, for value received, waives notice of any extension of time or alteration made by LFUCAB.

Whenever Principal shall be, and declared by the Obligee to be, in default under the Contract, the Surety may promptly remedy the default at the Surety’s expense, or shall promptly:

1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination of the Surety and LFUCAB jointly of the lowest responsible bidder, arrange for a Contract between such bidder and Obligee, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages and Liquidated Damages for which the Surety may be liable hereunder, the penal sum set forth herein. The term “balance of the Contract price” as used in this paragraph shall mean the total amount payable by Obligee to Principal under the Contracts and amendments thereto, less the amount properly paid by Obligee to Principal. Surety shall fully indemnify and save the Obligee harmless from all costs and damages which it may suffer by reason of failure to do so, including attorneys’ and consultants’ fees, and shall reimburse and repay the Obligee all outlay and expense which the Obligee may incur in making good any default of the Surety’s principal.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Obligee named herein or heirs, executors, administrators, or successors of LFUCAB.

Signed and Sealed this________day of _____________________, 20__.  

___________________________(Seal)  
(Principal)  

_____________________________  
(Witness)  
(Title of Principal)  

___________________________(Seal)  
(Surety)  

_____________________________  
(Witness)  
(Title of Surety)
NOTE:  

(1) Date of BOND must not be prior to date of Contract. If PRINCIPAL is Partnership, all partners should execute BOND.

(2) A valid Power of Attorney must be attached hereto from a Kentucky agent of the Surety.

Important: Surety companies executing BONDS must appear on the United States Treasury Departments’ most current list (Circular 570 as amended) and be authorized to transact business in the Commonwealth of Kentucky.
PAYMENT BOND

BLUE GRASS AIRPORT
FAYETTE COUNTY, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION
B.G.A. PROJECT NO. 1205

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned (Contractor, mailing address)_________________________________________, as Principal (hereinafter called the "Principal") and (Surety, mailing address) _______________, as Surety (hereinafter called the "Surety"), are held and firmly bound unto the Lexington Fayette Urban County Airport Board, 4000 Terminal Drive, Lexington, Kentucky, 40510 (hereinafter called the "Obligee"), in the penal sum of _______________ Dollars ($_____________), for the payment of which we jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the above-named Obligee dated ________________________, 20____, a copy of which Contract is incorporated hereby by reference and is made a part hereof as if fully copied herein.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly pay all lawful claims to all claimants, as hereinafter defined, for all labor (and for all unemployment contributions (as provided in KRS 341.317) which become due and payable under Kentucky Unemployment Insurance Law) and material and equipment directly or indirectly used or reasonably required for use in the performance of the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as a person or entity having a direct contract with the Principal or with a Subcontractor of the Principal to furnish labor, material or both, directly or indirectly used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of the water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract, architectural and engineering services required for performance of the work of the Principal and all other for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment are furnished.

2. With respect to the Obligee, this obligation shall be null and void if the Principal:
   2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
   2.2 Defends, indemnifies and holds harmless the Obligee from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Contract, provided the
Obligee has promptly notified the Principal and the Surety of any claims, demands, liens or suits and tendered defenses of such claims, demands, liens or suits to the Principal and the Surety.

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

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

   4.1 Claimants who are employed by or have a direct contract with the Principal have given notice to the Surety within 90 days the last day of the month in which labor or materials were supplied and sent a copy of the notice to the Surety, or notice thereof, to the Obligee, 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 the Principal:

       .1 Have filed a Lien Statement in the County Clerk's Office where the property is located within 90 days after the last day of the month in which labor or materials were furnished, verified by affidavit of the claimant or agent of the claimant and stating with substantial accuracy, the amount of the claim, the date labor or materials were last furnished and project the labor or materials were furnished; and

       .2 Have delivered an attested copy of the Lien Statement to Obligee and delivered a signed copy of a letter addressed to the Principal at his address with a post office receipt or certified returned mail receipt showing that an attested copy of the Lien Statement has been sent by the claimant to the Principal; and

       .3 Have either received a rejection in whole or in part from the Principal, or not received within 30 days of furnishing the above notice any communication from the Principal indicating the claim to be paid directly or indirectly; and

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

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

   5.1 Send an answer to the Claimant, with a copy to the Obligee, within 30 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

   5.2 Pay or arrange for payment of any undisputed amounts.

6. The 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 the Surety.
7. Amounts owed by the Obligee to the Principal under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Principal furnishing and the Obligee accepting this Bond, they agree that all funds earned by the Principal but not yet paid to the Principal in the performance of the Contract are dedicated to satisfy obligations of the Principal and the Surety under this Bond, subject to:

7.1 Claimant's diligence to comply with the requirements of paragraph 4; and

7.2 Obligee's priority to use the funds, not yet earned by the Principal, for the completion of the Contract work.

8. The Surety shall not be liable to the Obligee, Claimants or others for obligations of the Principal that are unrelated to the Contract. The Obligee shall not be liable for payment of any costs or expenses of any Claimant under this Bond.

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

10. 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 within 6 months from the date on which the Claimant give the notice required by Subparagraph 4.1 or Clause 4.2.1. 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.

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

12. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal 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.

13. The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant and have execution thereon. The Obligee shall not be liable for the payment of any costs or expenses of any suit.

14. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Principal shall promptly furnish a copy of this Bond or shall permit a copy to be made.
Effective as of this ____________ day of ______________________, 20____ (must be effective as of a date not prior to the date of the Contract).

In the presence of:

____________________________________  ______________________________________

(Witness)  

By:_________________________ (Seal)

____________________________________  ______________________________________

(Witness) 

By:_________________________ (Seal)

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570, as amended) and be authorized to transact business and to underwrite and issued bonds in the Commonwealth of Kentucky. Bonds must be signed by a licensed resident Kentucky Agent on behalf of the Surety as the Surety’s Attorney-in-Fact. A current Power of Attorney of the Surety’s agent must be attached at such time as this bond is delivered to LFUCAB. If the Principal is a Partnership, all partners must execute the Bonds.
MONTHLY EMPLOYEE UTILIZATION REPORT

U. S. Department of Labor
Employment Standards Administration
Office of Federal Contract Compliance Program

This report is required by Executive Order 11246, Sec. 203. Failure to report can result in contracts being cancelled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts.

1. Covered area:
2. Employer’s I.D. #
3. Current Goals
   Minority: 28.3%
   Female: 6.9%
4. Reporting period
   From: 
   To: 

Name and Location of Contractor

Federal Funding Agency

<table>
<thead>
<tr>
<th>Project Name and Number</th>
<th>Location of Project</th>
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6. TOTAL FEDERAL & NON-FEDERAL CONSTRUCTION WORK HOURS

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<th>Construction Trade</th>
<th>Classification</th>
<th>6a. Total All Employees By Trade</th>
<th>6b. Black (Not of Hispanic Origin)</th>
<th>6c. Hispanic</th>
<th>6d. Asian or Pacific Islander</th>
<th>6e. American Indian or Alaskan Native</th>
<th>7. Minority Percentage</th>
<th>8. Female Percentage</th>
<th>9. Total Number of Employees</th>
<th>10. Total Number of Minority Employees</th>
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11. Company Official’s Signature & Title
12. Area Code & Phone Number
13. Date Signed

Page _____ of _____
TO: LEXINGTON FAYETTE URBAN COUNTY AIRPORT BOARD

DATE____________________

PROJECT NO. ______________

DESCRIPTION: ________________________________________________

THIS IS TO CERTIFY THAT__________________________________________
(Name and Address of Insured)

is, at the date of this certificate, insured by this company with respect to business operations hereinafter described, for the types of insurance and in accordance with the provisions of the standard policies used by this company, and further hereinafter described. Exceptions to standard policy noted on reverse side hereof.

**TYPES OF INSURANCE**

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<th>Policy Number</th>
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Locations Covered: ________________________________________________

BX58:33156:363542:1:LEXINGTON CONSTRUCTION

ATTACHMENT 12
Descriptions of Operations Covered_______________________________

The above policies either in body thereof or by appropriate endorsement provide that they may
not be changed or canceled by the insured in less than five days after the insured has received
written notice of such change or cancellation.

Where applicable, local laws or regulations require more than five days actual notice of change
or cancellation to the assured, the above policies contain such specific requirements, either in the
body thereof or by appropriate endorsement thereto attached.

________________________
(Name of Insurer)

BY:________________________

TITLE:_______________________
CONSTRUCTION SAFETY/SECURITY PROGRAM BROCHURE

FOR

BLUE GRASS AIRPORT

LEXINGTON, KENTUCKY

BLUE GRASS AIRPORT CUSTOMS FACILITY RENOVATION

BLUE GRASS AIRPORT PROJECT NO. 1205
CONSTRUCTION SAFETY/SECURITY PROGRAM BROCHURE

I. GENERAL

This section of specifications prescribes the procedures, rules, and authorities to be followed during construction of this Project. The material set forth in this section is based on Department of Transportation, Federal Aviation Administration (FAA) Advisory Circular No. 150/5370-2E, dated January 17, 2003, its references and current changes. Nothing in this section supersedes or alters the contents of the above Advisory Circular, its references and changes and to all other advisory material pertaining to operational safety on airports, especially during periods of construction activity. The Contractor will be responsible for coordinating and controlling all construction activities in such a manner as to:

1. Maintain safety of airport operations.
3. Minimize aircraft operations and construction activity conflicts, while work is performed within the limits of operations.
4. Minimize flight operation delays.
5. Keep the airport operational for all user aircraft.

By adhering to the described procedures, there will be only minimal penetration of the approach/departure clearance zones.

II. PROJECT DESCRIPTION

2,000 square foot General Aviation Facility renovation of an existing customs facility inside an existing storage / shipping building and other Work in the Contract Documents.

Hours of operation will be as approved by the Director of Planning and Development on a case-by-case basis. Every effort will be made to accommodate a daytime work schedule; however, the primary consideration will be to eliminate disruptions to regularly scheduled air traffic and terminal operations.

III. CONSTRUCTION SEQUENCE

This project will require special coordination between the Planning and Development office, airport security, and the FAA. While working within the runway and taxiway safety limits, particular care will be required to maintain an orderly and professional line of communication with the Planning and Development Director, airport security and the Project Engineer.

Before the contractor begins work, a schedule of operations will be submitted to the Planning and Development Director for review and comment. Only after this schedule has been approved will the contractor(s) be allowed to commence operations.
IV. CONSTRUCTION SECURITY REQUIREMENTS

A. Contractor shall maintain Blue Grass Airport security of the Air Operations Area (AOA) and/or the Security Identification Display Area (SIDA) at all times during construction. Security fencing and gates, both temporary and existing, shall be secured/locked or manned at all times. Temporary fence and gates shall be provided at locations as coordinated and as directed by the Engineer.

B. The Contractor shall comply with Blue Grass Airport’s Safety Regulations and Policies. Contractor and Subcontractor’s employee’s requesting unescorted access to the AOA and SIDA areas must undergo a criminal history records check, which involves fingerprinting, and complete SIDA training prior to beginning work. SIDA applications may be obtained in BGA’s Planning and Development or Operations Departments. A non-refundable fee of $35.00 will be charged for processing fingerprints and SIDA training for each person. This fee will be collected by BGA’s Accounting Department at the time the Contractor submits the completed SIDA applications. Contractor shall coordinate SIDA training and fingerprinting with Blue Grass Airport. Once issued, the identification badge must be worn externally at all times while on airport property. An escort badge is required for any personnel who will be escorting unbadged persons within the AOA. The contractor shall designate a minimum number of persons as escorts to facilitate efficient construction activities and adherence to security regulations.

C. All Contractor’s/Subcontractor’s vehicles descriptions must be submitted for approval no less than 3 days prior to entry of the AOA or SIDA. The vehicle description must include the make, model, license number, company name and driver. Before entering the SIDA (Figure 1) of the airport, all construction vehicles shall be inspected by authorized airport personnel. Vehicles shall be inspected each time the vehicle enters the SIDA. At the discretion of the inspector, vehicle inspections will include the following, but are not limited to:

1. Passenger compartments of the vehicle, vehicle trunk or the bed/cargo area of a truck must be inspected.
2. Vehicle operator must have in possession a commercial manifest which identifies the contents of the vehicle and or trailer.
3. Boxes, cartons, containers, racks or packages that have been commercially prepared, labeled and sealed do not need to be physically opened if the external appearance does not indicate any signs of tampering or alteration.
All Contractor’s/Subcontractor’s vehicles shall be escorted by authorized badged personnel to their destinations while inside the AOA and/or SIDA. All Contractor’s/Subcontractor’s vehicles inside the AOA must have a sign or placard on both sides of the vehicle identifying the vehicle as the Contractor’s/Subcontractor’s.

D. Contractor will be responsible for returning to Blue Grass Airport all identification badges issued in relation to the project when all work is complete.

E. All work shall be in accordance with the Contractor’s approved work plan.

F. Contractor shall provide construction barricades, gates and fencing as required during construction.

V. CONSTRUCTION SAFETY REQUIREMENTS

A. Obstructions to Navigation

When penetration of approach/departure clearances is a necessity during construction, by motor vehicles, backhoes, other construction equipment, structures, stockpiles, etc., the Director of Planning and Development will issue a NOTAM (Notice to Airmen) prior to commencing work in this area or any other area where work off the pavement edge within the runway or taxiway safety areas will be required. This NOTAM shall warn aircraft of (1) activities along the runway, (2) their duration, and (3) other pertinent information relating to the overall scope of the project to that particular NOTAM.

Equipment operating on an airport runway, or within 250 feet of the centerline, will be in direct communication with the ATC personnel. To effect this communication, the Contractor must provide two-way Aviation radios for each vehicle or located nearby so that direct, rapid communication between the ATC personnel and equipment operations is possible. Operators of such equipment shall be instructed in and understand the operation of the radios and be experienced at working the radio instructions to the satisfaction of BGA.

B. Taxiway Clearances

Large aircraft wings extend beyond the edges of paved taxiways when planes are taxiing. It is, therefore, critical that no construction vehicles, equipment or materials enter or be placed within obstacle free areas, without prior approval from the Director of Planning and Development. It is proposed that during construction activities, taxiway obstacle free areas be flagged in critical areas of construction activity by the Contractor. When safety and obstacle free areas must be infringed upon by construction activities for extended periods of time, plans of infringements will be agreed upon by the Contractor with the Director of Planning and Development and airlines, adequately in advance, so that NOTAMS may be issued and airlines informed. Figures 2A and 2B depict required clearances for runways and taxiways.
Construction equipment normally should not penetrate the 50:1 approach surface at runway ends.

C. Navigational Aids

Any unplanned, unapproved, or accidental shutdown of any navigational aid requires immediate notification of the Director of Planning and Development, and DPS Communications by the Contractor.

D. Trenches or Open Excavation

All excavations or stockpiling of materials within taxiway safety or obstruction free areas (FAR Part 77) shall be flagged and lighted during hours of darkness by the Contractor. AC 150/5340-1J, dated April 29, 2005, “markings of paved areas on airports” spells out conditions and methods of marking and lighting. All excavation within the safety zone shall be delineated by barriers as detailed in the plans. No open trenches, excavation, or vertical drop offs in excess of 3 inches will be allowed in aircraft safety zones while the runway and/or taxiway are operational.

E. Debris, Dirt, Etc., on Runway, Taxiway and Aprons

Runways, taxiways and aprons shall be kept free of all debris, dirt, etc., at all times. Any accidental spillage of excavation or other material shall be cleaned up immediately by the Contractor with a motor driven sweeper. The Engineer shall be promptly notified of the spillage. A program of regular inspections will be planned by the Director of Planning and Development and the Contractor. Inspections shall be made before the normal time for commencement of daily aircraft operations and more frequently, if construction activities are of a nature that debris may accumulate on runways, taxiways or aprons.

F. Storage of Equipment, Materials, or Excavation

The Contractor shall not store material or park equipment in aircraft operational areas when the equipment or material is not in use or about to be installed. Material or equipment in use in operation areas must be stored or parked in a manner that they may be quickly removed to accommodate aircraft operations.

G. Existing Runway Lights

The existing runway and taxiway lighting system shall remain operational during all parts of the project unless prior written approval is given by BGA Operations. The contractor shall protect the existing lights as necessary, to prevent accidental destruction of or unnecessary shutdown of those lights during non-working hours.
H. Drainage

Contractor shall not plug or demolish or remove existing drainage structures until new or temporary drainage facilities are installed and prior approval has been obtained by BGA.

I. Daily Inspection

A daily post-operation checklist will be required of the contractor. A sample form is included in this section.

At the end of each day’s construction activities, an inspection will be made to ensure the safety of the airfield. DPS must be contacted to conduct the surface check of the runway, if Planning and Development staff are unavailable. Items to be checked include:

1. Taxiways and aprons clear of debris and accumulation or dust and/or mud
2. Equipment, material, and vehicles parked or stored not less than 250 feet from centerline or active runways and not less than 139 feet from centerline of active taxiways, without the expressed permission of the Planning and Development Director.
3. No open trenches or excavations in excess of three (3) inches deep and no rough grades within aircraft safety zones.
4. Markings of closed areas correctly and securely placed.
5. Temporary barricades removed and stored at a safe location.
6. Engineer informed of the work planned for the next day.
7. No equipment or vehicles parked within 10’ of the Airport Security Fence.

J. Communication Requirements: A positive communication system between the following shall be required:

- Executive Director – Planning and Development Director
- Planning and Development Director – Project Engineer
- Director of Operations - Airline and Other Users

The Planning and Development Director, Contractor, and airline representatives should meet bi-weekly, or more often as required, to discuss and plan future construction activity, potential impact of construction on aircraft operations, procedures to maintain aircraft operations and safety, and to facilitate construction activity.

Planning should involve:

1. Communication procedures
2. Modification of normal aircraft operations procedures such as:
   a. Delays of landings or departures
   b. Change of taxi routes
   c. Navigational air outages

3. Required disruption of contractor activities:
   a. Move vehicles, equipment, and/or materials from approach and transition runways/taxiways
   b. Vehicles crossing runways/taxiways
   c. Cleanup of dirt and debris on zones.

4. Notice to Airmen (NOTAMs)
5. Direct notification to air carriers
6. Local notices to all aircraft operators

K. Applicable Standards: Advisor Circular (AC) 150/5370-2E will be used as a guideline to assist in maintaining operational safety during construction activities. The Contractor’s attention is also directed to AC 150/5200-18C, “Airport Safety Self Inspection,” AC 150/5210-20, “Ground Vehicle Operations on Airports,” AC 150/5380-5, “Debris Hazards at Civil Airports,” FAR Part 139, and any other safety items discussed at the preconstruction conference or provided by the FAA during the project.

FAR Part 77, not included herein, will be used to define “Objects Affecting Navigable Airspace.”

L. Payment: Measurement and payment for barricades, lighting systems, flags, flagmen, broommen, temporary markings, two-way radios, or any other items called for by this Section of this Specification or its references, will not be paid for separately, as these items are considered a subsidiary obligation.
DAILY POST-OPERATION CHECKLIST
BLUE GRASS AIRPORT
LEXINGTON, KENTUCKY

DAY________________________________________ TIME________________________

NOTE: This inspection is to be completed by the Contractor no less than thirty (30) minutes after completion of the day’s work or if any subsequent construction work may cause debris to be deposited on runway, taxiway, or aprons.

1. Taxiway and apron inspected full length and width. Must be clear of debris and accumulated dust/dirt.
2. Approach path clear of obstructions.
3. Departure path clear of obstructions.
4. Taxiway laterals clear, zones clear of vehicles, equipment, or materials.
5. Aircraft parking area clear of obstacles.
6. Airport check coordinated with the Project Engineer.
7. Airport check reported to Manager of Engineering and Construction.
9. Review Tool and Prohibited Items Lists with DPS.
10. Review day’s construction activity.
11. No equipment or vehicles parked within 10 feet of Airport Security Fence.

________________________________________
CONTRACTOR

________________________________________
PROJECT ENGINEER
1. GENERAL SAFETY REQUIREMENTS

Throughout the construction project, the following safety and operational practices should be observed:

- Operational safety should be a standing agenda item during progress meetings throughout the construction project.
- The contractor and owner must perform onsite inspections throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
- Airport runways and taxiways should remain in use by aircraft to the maximum extent possible.
- Aircraft use of areas near the contractor’s work should be controlled to minimize disturbance to the contractor’s operation.
- Contractor, subcontractor, and supplier employees or any unauthorized persons must be restricted from entering an airport area that would be hazardous.
- Construction that is within the safety area of an active runway, taxiway, or apron that is performed under normal operational conditions must be performed when the runway, taxiway, or apron is closed or use-restricted and initiated only with prior permission from the owner.
- The contracting officer, owner, or other designated airport representative may order the contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

2. CONSTRUCTION MAINTENANCE AND FACILITIES MAINTENANCE.

72 hours prior to beginning any construction activity, the contractor must, through the owner, give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the contractor must, through the owner, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the contractor must—

a. Be aware of and understand the safety problems and hazards described in AC 150/5370-2E, Operational Safety on Airports During Construction.

b. Conduct activities so as not to violate any safety standards contained in AC 150/5370-2E or any of the references therein.

c. Inspect all construction and storage areas as often as necessary to be aware of conditions.

d. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.
3. APPROACH CLEARANCE TO RUNWAYS

Runway thresholds must provide an unobstructed approach surface over equipment and materials. (Refer to Appendix 2 in AC 150/5300-13, Airport Design, for guidance in this area.)

4. RUNWAY AND TAXIWAY SAFETY AREA (RSA AND TSA)

Limit construction to outside of the approved RSA, as shown on the approved airport layout plan—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA that is equal to the RSA available during construction (see AC 150/5370-2E for exceptions). Construction activity within the TSA is permissible when the taxiway is open to aircraft traffic if adequate wingtip clearance exists between the aircraft and equipment/material; evacuations, trenches, or other conditions are conspicuously marked and lighted; and local NOTAMs are in effect for the activity (see AC 150/5300-13 for wingtip clearance requirements). The NOTAM should state that, “personnel and equipment are working adjacent to Taxiway____.”

a. Procedures for protecting runway edges.

- Limit construction to no closer than 200 feet (60m) from the runway centerline—unless the runway is closed or restricted to aircraft operations, requiring a lesser standard RSA that is equal to the RSA available during construction.

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, Paragraph 306, “Obstacle Free Zone (OFZ),” from penetrating the OFZ.

- Coordinate construction activity with the Airport Traffic Control Tower (ATCT) and FAA Regional Airports Division Office or Airports District Office, and through the owner, issue an appropriate NOTAM.

<table>
<thead>
<tr>
<th>Runway</th>
<th>Aircraft Approach Category A, B, C, or D</th>
<th>Airplane Design Group I, II, III, or IV</th>
<th>RSA Width in Feet Divided by 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-22</td>
<td>C</td>
<td>III</td>
<td>250</td>
</tr>
<tr>
<td>8-26</td>
<td>B</td>
<td>I</td>
<td>60</td>
</tr>
</tbody>
</table>

b. Procedures for protecting runway ends.

- Maintain the RSA from the runway threshold to a point at least the distance from the runway threshold as existed before construction activity—unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA length available during construction in accordance with AC 150/5300-13. This may involve the use of declared distances and partial runway closures (see AC 150/5370-2E for exceptions).

- Ensure all personnel, materials, and/or equipment are clear of the applicable threshold siting criteria surface, as defined in Appendix 2, “Threshold Siting Requirements,” of AC 150/5300-13.

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, from penetrating the obstacle-free zone.

- Ensure adequate distance for blast protection is provided, as needed.
• Coordinate construction activity with the ATCT and FAA Regional Airports Division Office or Airports District Office, and through the owner, issue an appropriate NOTAM.

• The plans indicate the profile of the appropriate surfaces of the runway end where construction will take place. Contractor must review takeoff procedures and jet blast characteristics of aircraft and incorporate safety measures for construction workers.

<table>
<thead>
<tr>
<th>Runway End Number</th>
<th>Airplane Design Group I, II, III, or IV</th>
<th>Aircraft Approach Category A, B, C, or D</th>
<th>Minimum Safety Area Prior to the Threshold</th>
<th>Minimum Unobstructed Approach Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using</td>
<td>Existing</td>
<td>Threshold</td>
<td>600 feet</td>
<td>34:1 to 200 ft. in front of threshold</td>
</tr>
<tr>
<td>4-22</td>
<td>III</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using</td>
<td>Temporary</td>
<td>Threshold</td>
<td>During Construction</td>
<td></td>
</tr>
<tr>
<td>4-22</td>
<td>III</td>
<td>C</td>
<td>600 feet</td>
<td>20:1 to 200 ft. in front of temporary threshold*</td>
</tr>
</tbody>
</table>

* Night-time construction will be closely coordinated with the Engineer and may be subject to short duration pull backs.

5. **MARKING AND LIGHTING FOR TEMPORARY_THRESHOLDS**

Marking and lighting for a temporary threshold is required. The contractor will furnish and maintain markings for temporary thresholds as shown on the plans. Precision approach path indicators (PAPIs) and runway end identification lights (REILs) are required. The contractor, as specified in the contract, will furnish and install all temporary lighting.

6. **CLOSED RUNWAY MARKINGS AND LIGHTING**

No runway closures are currently anticipated. If a runway closure becomes necessary, lighted runway closure “X”s will be used. The following must be specified for closed runways and will be supplied by the contractor: barricades, flagging and flashers are required at taxiways and runway.

7. **HAZARDOUS AREA MARKING AND LIGHTING**

Hazardous areas on the movement area will be marked with barricades as shown on the plans. These markings restrict access and make hazards obvious to aircraft, personnel, and vehicles. During periods of low visibility and at night, identify hazardous areas with barricades with red flashing. The hazardous area marking and lighting will be supplied by the contractor, and is depicted on the plans.

8. **TEMPORARY LIGHTING AND MARKING**

Airport markings, lighting, and signs will be altered during the period from 9:30 p.m. to 5:30 a.m. when the temporary threshold is in use. The procedures for setup and removal of the temporary threshold are depicted on the plans (if applicable).
9. VEHICLE OPERATION MARKING AND CONTROL

a. A detailed description of all contractors’ vehicles shall be submitted no later 3 days prior to its use inside the AOA and/or SIDA. The description must include the make, model, license number, company and anticipated driver’s name. The list may be amended during the project, but any additions require 3 days notice prior to accessing the AOA and/or SIDA.

b. When any vehicle, other than one that has prior approval from the owner, must travel over any portion of an aircraft movement area, it will be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light, the color of which is in accordance with local or state codes.

c. Vehicles must display identification on each side of the vehicle. The identification symbols should be at minimum 4-inch (10-cm) block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable.

d. Employee parking is restricted to the staging areas shown on the plans.

e. Access to the job site shall be restricted to points shown on the plans.

f. All vehicle operators, including escorted vehicles, having access to the movement area must be briefed by the escort, or Department of Public Safety personnel, to follow airport procedures for the operation of ground vehicles and the consequences of noncompliance.

g. The owner will comply with the identification and control of construction equipment in accordance with the Airport Security Plan.

10. NAVIGATIONAL AIDS

The contractor must not conduct any construction activity within navigational aid restricted areas without prior approval from the local FAA representative. Navigational aids include instrument landing system components and very high-frequency omnidirectional range, airport surveillance radar. Such restricted areas are depicted on construction plans.

11. LIMITATIONS ON CONSTRUCTION

Additional limitations on construction include—

a. Prohibiting open-flame welding or torch cutting operations unless adequate fire safety precautions are provided and these operations have been authorized by the owner.

b. Prominently marking open trenches, excavations, and stockpiled materials at the construction and lighting these obstacles during hours of restricted visibility and darkness.

c. Marking and lighting closed, deceptive, and hazardous areas on airports, as appropriate.

d. Constraining stockpiled material and temporary installations of materials to prevent its movement as a result of the maximum anticipated aircraft blast and forecast wind conditions.
12. RADIO COMMUNICATIONS

Vehicular traffic located in or crossing an active movement area must have a working two-way radio in contact with the control tower or be escorted by a person in radio contact with the tower. The driver, through personal observation, should confirm that no aircraft is approaching the vehicle position. Two-way radio communications are required between contractors and the Airport Traffic Control Tower. Continuous monitoring is required when equipment movement is within the Runway and Taxiway Safety Areas and below the Runway Protection Zone. Radio training will be provided by Planning and Development staff or by DPS. BGA, in conjunction with the LEX ATCT, will establish radio identification numbers for construction vehicles to establish clear and concise two-way radio communication.

13. DEBRIS

Waste and loose material must not be placed in active movement areas. Materials tracked onto these areas must be removed continuously during the work project.
SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.


2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

   a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
   b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
   c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution via addendum prior to bid opening.

a. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

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

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.

B. Key Personnel Names: Within 15 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 cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, and in prominent location in built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

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

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

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

1. Preparation of Contractor’s construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

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

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
   a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow five working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:
   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for approval of Contractor's means and methods.
   d. Requests for coordination information already indicated in the Contract Documents.
   e. Requests for adjustments in the Contract Time or the Contract Sum.
   f. Requests for interpretation of Architect's actions on submittals.
   g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.

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.
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at each progress meeting.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

E. 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 days if Contractor disagrees with response.
1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Architect's Data Files Not Available: Architect will not provide Architect's CAD drawing digital data files for Contractor's use during construction.

1.8 PROJECT MEETINGS

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

   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

   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. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:

      a. Responsibilities and personnel assignments.
      b. Tentative construction schedule.
      c. Designation of key personnel and their duties.
      d. Lines of communications.
      e. Procedures for processing field decisions and Change Orders.
      f. Procedures for RFIs.
      g. Procedures for processing Applications for Payment.
      h. Submittal procedures.
      i. Preparation of Record Documents.
      j. Use of the premises and existing building.
      k. Work restrictions.
      l. Working hours.
      m. Owner's occupancy requirements.
      n. Responsibility for temporary facilities and controls.
      o. Procedures for disruptions and shutdowns.
      q. Parking availability.
      r. Office, work, and storage areas.

   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   a. Related RFIs.
   b. Related Change Orders.
   c. Submittals.
   d. Review of mockups.
   e. Possible conflicts.
   f. Time schedules.
   g. Weather limitations.
   h. Manufacturer's written instructions.
   i. Warranty requirements.
   j. Compatibility of materials.
   k. Acceptability of substrates.
   l. Installation procedures.
   m. Coordination with other work.
   n. Required performance results.
   o. Protection of adjacent work.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at monthly (minimum) intervals.

1. Coordinate dates of meetings with preparation of payment requests.

2. 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 meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      1) Review schedule for next period.

   b. Review present and future needs of each entity present, including the following:
      1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Status of sustainable design documentation.
5) Deliveries.
6) Access.
7) Site use.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of Proposal Requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

   E. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

   1. Reporting: 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 Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100
SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS
A. General: Basic Contract definitions are included in the Conditions of the Contract.
B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
H. "Provide": Furnish and install, complete and ready for the intended use.
I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS
A. Applicability of Standards: Unless 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.
B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

4. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
7. ACI - American Concrete Institute; (Formerly: ACI International); [www.concrete.org](http://www.concrete.org).
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); [www.aeic.org](http://www.aeic.org).
11. AGA - American Gas Association; [wwwagenda.org](http://wwwagenda.org).
15. AIA - American Institute of Architects (The); [www.aia.org](http://www.aia.org).
24. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
25. ARMA - American Refrigeration Institute; (See AHRI).
27. ASCE - American Society of Civil Engineers; [wwwasce.org](http://wwwasce.org).
28. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - CSA Group; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.cosinet.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
75. EIA - Electronic Industries Alliance; (See TIA).
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
95. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
96. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
100. IAS - International Accreditation Service; www.iasonline.org.
101. ICBO - International Conference of Building Officials; (See ICC).
103. ICEA - Insulated Cable Engineers Association, Inc.; www.ieca.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
119. ISSSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int/home.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
125. MCA - Metal Construction Association; www.metalconstruction.org.
139. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA - National Concrete Masonry Association; www.ncma.org.
142. NECA - National Electrical Contractors Association; www.necanet.org.
144. NEMA - National Electrical Manufacturers Association; www.nema.org.
146. NFHS - National Federation of State High School Associations; www.nfhs.org.
148. NFPA - NFPA International; (See NFPA).
151. NLGA - National Lumber Grades Authority; www.nlga.org.
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
154. NRCA - National Roofing Contractors Association; www.nrca.net.
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
161. PCI - Precast/Prestressed Concrete Institute; www pci.org.
162. PDI - Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
168. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI - Steel Deck Institute; www.sdi.org.
170. SDI - Steel Door Institute; www.steeldoor.org.
171. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
175. SMA - Screen Manufacturers Association; www.smainfo.org.
176. SMACNA - Sheet Metal and Air Conditioning Contractors’ National Association; www.smacna.org.
177. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
186. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
187. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
194. TPI - Turfgrass Producers International; www.turfgrasssoc.org.
197. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV - USA Volleyball; www.usavolleyball.org.
201. WA - Wallcoverings Association; www.wallcoverings.org.
203. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
204. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
208. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
6. **EPA** - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
13. **SD** - Department of State; [www.state.gov](http://www.state.gov).
15. **USDA** - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
16. **USDOJ** - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).

**E. Standards and Regulations:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

3. **DSCC** - Defense Supply Center Columbus; (See FS).
4. **FED-STD** - Federal Standard; (See FS).
6. **MILSPEC** - Military Specification and Standards; (See DOD).
8. **USATBCB** - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

**F. State Government Agencies:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. **CBHF**; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; [www.bearhfti.ca.gov](http://www.bearhfti.ca.gov).
2. **CCR**; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.calregs.com](http://www.calregs.com).
3. **CDHS**; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; [www.cal-iaq.org](http://www.cal-iaq.org).
5. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
6. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; [www.txforestservice.tamu.edu](http://www.txforestservice.tamu.edu).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200
SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner’s acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing with 3 strand barbed wire at top; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts. Contractor’s option: barbed wire may be omitted with height of fence is 8'-0" minimum.

B. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Owner will provide interior space for field offices off site nearby for use for progress meetings.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille.
in system and remove at end of construction, and clean HVAC system as required in Section 017700 "Closeout Procedures."

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

   A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

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

3.2 INSTALLATION, GENERAL

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

   B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

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

   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

   B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

   C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

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

   E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
   2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.

G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

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

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
   2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 “Execution.”

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
   1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

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

D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
   1. Extent of Fence: As indicated on Drawings.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
   1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

J. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
   1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
   4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
   a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
   b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
   c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.
3.7 OPERATION, TERMINATION, AND REMOVAL

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

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

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

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 “Closeout Procedures.”
SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. Installation of the Work.
2. Cutting and patching.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety

   a. Primary operational systems and equipment.
   b. Fire separation assemblies.
   c. Air or smoke barriers.
d. Fire-suppression systems.
e. Plumbing piping systems.
f. Mechanical systems piping and ducts.
g. Control systems.
h. Communication systems.
i. Fire-detection and alarm systems.
j. Conveying systems.
k. Electrical wiring systems.
l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

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

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 “Project Management and Coordination.”

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

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

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

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

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

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

J. Repair or remove and replace damaged, defective, or nonconforming Work.
   1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.4 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
   a. Use containers intended for holding waste materials of type to be stored.
4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

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

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

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

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

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 “Temporary Facilities and Controls.”

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

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

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

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

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

D. Manufacturer’s Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

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

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer’s written instructions for temperature and relative humidity.

END OF SECTION 017300
SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary
      Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for contract closeout, including,
      but not limited to, the following:
      1. Substantial Completion procedures.
      2. Final completion procedures.
      3. Warranties.
      4. Final cleaning.
      5. Repair of the Work.
   B. Related Requirements:
      1. Section 017823 "Operation and Maintenance Data" for additional operation and
         maintenance manual requirements.
      2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record
         Specifications, and Record Product Data.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of cleaning agent.
   B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
   C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS
   A. Certificates of Release: From authorities having jurisdiction.
   B. Certificate of Insurance: For continuing coverage.
   C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS
   A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in
      other Sections.
1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.
   a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Complete final cleaning requirements.
7. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 “Payment Procedures.”

2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:

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

4. Submit list of incomplete items in the following format:


1.9 SUBMITTAL OF PROJECT WARRANTIES
A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

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

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
   1. Submit on digital media acceptable to Architect.

D. Warranties in Paper Form:
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 “Temporary Facilities and Controls.” Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 “Temporary Facilities and Controls.”

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
   a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700
SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operation and maintenance documentation directory manuals.
   2. Emergency manuals.
   3. Systems and equipment operation manuals.
   4. Systems and equipment maintenance manuals.
   5. Product maintenance manuals.

1.3 DEFINITIONS
A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS
A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
B. Format: Submit operation and maintenance manuals in the following format:
   1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
C. Initial Manual Submittal: Submit draft copy of each manual at least 20 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 10 days before commencing demonstration and training. Architect will return copy with comments.

E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit final manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.


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

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in
1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

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

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

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.
E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers’ maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
   a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
   1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
   2. Maintenance and Service Record: Include manufacturers’ forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers’ maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers’ printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
   1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:
   1. Product name and model number.
   2. Manufacturer's name.
   3. Color, pattern, and texture.
   5. Reordering information for specially manufactured products.
E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures.
   2. Types of cleaning agents to be used and methods of cleaning.
   3. List of cleaning agents and methods of cleaning detrimental to product.
   4. Schedule for routine cleaning and maintenance.
   5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Product Data.
3. Miscellaneous record submittals.

B. Related Requirements:

1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:
   a. Initial Submittal:
      1) Submit PDF electronic files of scanned record prints and one of file prints.
      2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
   b. Final Submittal:
      1) Submit one paper-copy set(s) of marked-up record prints.
      2) Submit Owner record digital data files.
      3) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

   a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
   b. Accurately record information in an acceptable drawing technique.
   c. Record data as soon as possible after obtaining it.
   d. Record and check the markup before enclosing concealed installations.
   e. Cross-reference record prints to corresponding photographic documentation.

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

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

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders and record Drawings where applicable.

C. Format: Submit record product data as scanned pdf electronic file(s) of marked-up paper copy of product data.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked up miscellaneous record submittals.

1.7 MAINTENANCE OF RECORD DOCUMENTS

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

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839
SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises.
2. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner’s operations will not be disrupted.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner’s operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. Standards: Comply with ASSE A10.6 and NFPA 241.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

   a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
   c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
   d. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   e. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain adequate ventilation when using cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction as required.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119
SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 DEFINITIONS
A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS
A. Qualification Data: For Installer, manufacturer and testing agency.
B. Welding certificates.
C. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.

D. Material Test Reports: For the following, from a qualified testing agency:
   1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade I, according to ACI CP-1 or an equivalent certification program.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
1.8 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301 (ACI 301M).
2. ACI 117 (ACI 117M).

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. High-density overlay, Class 1 or better.
   b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
   c. Structural 1, B-B or better; mill oiled and edge sealed.
   d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

E. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

F. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

G. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

D. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I.
2. Fly Ash: ASTM C 618, Class F or C.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.


2.6 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm long.

1. Euclid Chemical Company (The); Fibersman D F.
2. Grace Construction Products, W.R. Grace & Company; Grace Fibers
3. SI Concrete Systems; Fibermesh

2.7 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers:
   a. Biometals, Inc.
   b. Greenstreak
2. Profile: Flat dumbbell with center bulb.
3. Dimensions: 6 inches by 3/8 thick (150 mm by 10 mm thick); non tapered.

B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).
1. Colloid Environmental; Volclay Waterstop- PK
2. Concrete Sealants Inc.; Conseal CS-231
3. Greenstreak; Swellsstop
4. Henry Company; Hypo-flex
5. JP Specialties; Earthshield Type 20
6. Progress Unlimited; Superstop
7. Tcmiradri; Mirastop

2.8 VAPOR BARRIERS

A. Sheet Vapor Barriers: ASTM E 1745, Class A 20-mil minimum thickness. Include manufacturer's recommended adhesive or pressure-sensitive tape. Single Ply Polyethylene is prohibited.
1. Fortifiber Corp; Moistop Ultra
2. Raven Industries Inc.; Vapor Block
3. Stego Industries, LLC; Stegowrap
4. W.R. Meadows; Sealtight “Perminator”
5. Strata Systems, Inc.; Strata Barrier 11
6. Insulation Solutions, Inc; Viper Vapor Check 11.

2.9 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Burke By Edoco; Berkefilm
2. Dayton Superior Corp; Sure Film
3. Euclid Chemical Co; Eucobar
4. MBT Protection Avd Repair; Confilm
5. Meadows W.R. Inc.; Sealtight Evapre
6. Sika Corp; Sikafilm

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.
E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Burke by Edoco; Spartan Cote WB11
2. Conspec Marketing & MFR Co.; Cure and Seal WB.
3. Dayton Superior Corp; Safe Cure and Seal (J-18)
4. Euclid Chemical Co.; Aqua-Cure Vox
5. Meadows W.R. Inc.; Vocomp-20
6. Symons Corp; Cure & Seal 18 Percent E.

2.10 RELATED MATERIALS


B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, according to ASTM D 2240.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.022-inch (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.11 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.12 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Normal-weight concrete.
   1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
   2. Maximum W/C Ratio: 0.50
   3. Slump Limit: 5.5 inches or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).

   1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
   2. Maximum W/C Ratio: 0.50
   3. Slump Limit: 5.5 inches or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
   4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
   5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

C. Slabs-on-Grade and Concrete Toppings: Normal-weight concrete.
   1. Minimum Compressive Strength: 4500 psi (31 MPa) at 28 days.
   2. Maximum W/C Ratio: 0.45
   4. Slump Limit: 5.5 inches or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
   5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
   6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
7. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.5 lb/cu. yd. (0.90 kg/cu. m).

2.14 FABRICATING REINFORCEMENT
A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.15 CONCRETE MIXING
A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

   1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION
A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

   1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.
I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer’s written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR-BARRIER INSTALLATION

A. Sheet Vapor Barrier: Place, protect, and repair sheet vapor barrier according to ASTM E 1643 and manufacturer’s written instructions.
1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete
when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. **Isolation Joints in Slabs-on-Grade**: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. **Doweled Joints**: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.7 WATERSTOP INSTALLATION

A. **Flexible Waterstops**: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. **Self-Expanding Strip Waterstops**: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

### 3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M)

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

   1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

   1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

   1. Apply to concrete surfaces exposed to public view, or to be covered with a coating or covering material applied directly to concrete.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screed and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.

   1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.
C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restrangle, cut down high spots, and fill low spots. Repeat float passes and restraigtening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraigten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4 inches (100 mm) high unless otherwise indicated, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4500 psi (31 MPa) at 28 days.
3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written
instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day’s pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day’s pour of each concrete mixture.

4. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure one set of four standard cylinder specimens for each composite sample.

5. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.

6. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

8. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

11. Additional testing and inspecting, at Contractor’s expense, will be performed to determine compliance of replaced or additional work with specified requirements.

12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Thin brick veneer system
2. Mortar and grout.

B. Related Requirements:
1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection:
1. Thin Brick
2. Stone trim.
3. Colored mortar.

1.4 DELIVERY, STORAGE, AND HANDLING

A. 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.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
1.5 FIELD CONDITIONS

A. 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. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.3 BRICK

A. Thin Brick:

1. Grade: SW.
2. Type: FBS.
3. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet (3 m).
6. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
7. Application: Use where brick is exposed unless otherwise indicated.
9. Compressive Strength: 1,000 psi (7.0 MPa), measured in accordance with ASTM C67
10. Kiln Fired 1/2" nominal thickness and must pass freeze / thaw testing in accordance with applicable ASTM Standards.
2.4  STONE TRIM UNITS

A. Limestone: ASTM C 568, Classification Medium Density.
   1. Variety and Sources: Indiana oolitic limestone quarried in Lawrence, Monroe, or Owen Counties, Indiana.
      a. Grade and Color: Oolitic ILI 2 Standard, according to grade and color classification established by ILI.

B. Finish: Smooth.

C. Provide stone units accurately shaped, with exposed faces dressed true, and with beds and joints at right angles to faces.
   1. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."

D. Fabrication:
   1. Fabricate stone to comply with sizes, shapes, and tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.
   2. Cut stone to produce pieces of thickness, size, and shape indicated, including details on Drawings. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.
   3. Cut and drill sinkages and holes in stone for anchors and supports.
   4. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
      a. Clean sawed backs of stone to remove rust stains and iron particles.
   5. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
      a. Finish: Smooth - finish exposed ends same as front and back faces.

2.5  MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Mortar Cement: ASTM C 1329.
1. **Products:** Subject to compliance with requirements,
   - b. Cemex S.A.B. de C.V.; Kosmorm Type N.
   - c. Essroc, Italcementi Group; Brixment.
   - d. Holcim (US) Inc.; Mortamix Masonry Cement.
   - e. Lafarge North America Inc.; Magnolia Masonry Cement.
   - f. Lehigh Cement Company; Lehigh Masonry Cement.

2. **Colored Portland Cement-Lime Mix:**
   - a. **Products:** Subject to compliance with requirements,
      - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
      - 3) Lafarge North America Inc.; Eaglebond Portland & Lime
      - 4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

3. **Colored Masonry Cement:**
   - a. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Capital Materials Corporation; Flamingo Color Masonry Cement.
      - 2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
      - 3) Essroc, Italcementi Group; Brixment-in-Color.
      - 4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
      - 6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.

4. **Pigments:**
   - 3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
   - 4. Pigments shall not exceed 10 percent of portland cement by weight.
   - 5. Pigments shall not exceed 5 percent of masonry cement by weight.

5. **Aggregate for Grout:**
   - G. **Aggregate for Grout:** ASTM C 404.

6. **Water:**
   - H. **Water:** Potable.

**2.6 MISCELLANEOUS MASONRY ACCESSORIES**

A. **Compressible Filler:** Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane.

B. **Bond-Breaker Strips:** Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).
C. Thin Brick Reinforcement Panel System

1. Metal Reinforcement Panel
   b. Material: Galvanized Steel, Aluminum or Stainless Steel.
   c. Panel shall be formed out of sheet metal with a minimum thickness of 0.010.
   d. Comply with current published instructions by Universal Brick Systems as applicable to each type of substrate indicated.
   e. Panel shall be applied to the substrate in true level rows and align at all corners.
   f. Panel shall be attached by installing manufacturer's specified fasteners on an average of 1 fastener per square foot or at least every 3 courses vertically and 16" (maximum) on center horizontally.

2. Thin Brick Adhesive:
   a. A high solid solvent based adhesive recommended by manufacturer that remains flexible and unaffected by freeze / thaw cycles.
   b. Brick shall be attached using manufacturer's recommended adhesive only.
   c. Bricks shall be spaced to insure that the head joints do not exceed 5/8" or fall below 1/4". The optimum head joint is 3/8".

3. Mortar:
   a. Apply to the joint areas using a mortar bag or pump.
   b. Do not apply mortar to brick panel system when the ambient outdoor temperature is below 36 degrees Fahrenheit unless temporary protection and heat is provided for a minimum 24 hours after installation.

   a. Basis of Design: Owens Corning; Weather Lock-G

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For masonry below grade or in contact with earth, use Type M.
   2. For reinforced masonry, use Type S.
   3. For interior nonload-bearing partitions, Type O may be used instead of Type N.

C. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
D. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

2.8 MASONRY CLEANERS

A. 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.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   - Diedrich Technologies, Inc.
   - ProSoCo, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. 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.

D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).

3.4 LAYING MASONRY WALLS

A. 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.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by stepping 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.

3.5 MORTAR BEDDING AND JOINTING

A. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 REPAIRING, POINTING, AND CLEANING

A. 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.

B. 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.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.7 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste and legally dispose of off Owner's property.

END OF SECTION 042000
SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:

1. Wood blocking and nailers.
2. Plywood backing panels.

1.3 DEFINITIONS
A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.  Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 INFORMATIONAL SUBMITTALS
A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
4. Post-installed anchors.
5. Metal framing anchors.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
   1. Treatment shall not promote corrosion of metal fasteners.
   2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
   3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
E. Application: Treat all miscellaneous carpentry unless otherwise indicated.] [Items indicated on Drawings, and the following:

1. Concealed blocking.
2. Plywood backing panels.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.

B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any species.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.

B. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
2.6 METAL FRAMING ANCHORS

A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
   1. Use for interior locations unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) 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 PROTECTION

A. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053
SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Mineral Wool Blanket

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE, AND HANDLING
   A. Protect insulation materials from physical damage and from deterioration due to 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.

PART 2 - PRODUCTS

2.1 MINERAL-WOOL BLANKETS
   A. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
      1. Industrial Instulation Group
      2. Roxul
      3. Thermafiber, Inc.; Owns Corning
PART 3 - EXECUTION

3.1 PREPARATION
   A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL
   A. Comply with insulation manufacturer's written instructions applicable to products and applications.
   B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
   C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
   D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION
   A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
      1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
      2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
      3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
      4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
   B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

3.4 PROTECTION
   A. Protect installed insulation 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.
END OF SECTION 072100
SECTION 074213 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Exposed-fastener, lap-seam metal wall panels (match existing).

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.
      1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
   B. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
      1. Include Samples of trim and accessories involving color selection.
   C. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
      1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS
   A. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including rupturing, cracking, or puncturing.
   b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:


B. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:


C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Taper Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs and stiffening ribs spaced at across width of panel to match existing.

1. Manufacturers:
   a. Centria
   b. Firestone
   c. MBCI
   d. McElroy Metal

2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

   a. Nominal Thickness: 0.028 inch (0.71 mm).
   c. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or
ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

   a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. 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 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.

C. Steel Panels and Accessories:

   1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

   1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

   a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer’s written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

   1. Shim or otherwise plumb substrates receiving metal panels.
   2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
   3. Install screw fasteners in predrilled holes.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Install flashing and trim as metal panel work proceeds.
   6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
   7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
   8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

   1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

   1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
   2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.

4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.

5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.

2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.

3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without 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 achieve waterproof performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213
SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
1. Formed wall sheet metal fabrications and trim.

1.3 COORDINATION
A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
B. Shop Drawings: For sheet metal flashing and trim.
1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of special conditions.
8. Include details of connections to adjoining work.
C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.
1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Stainless-Steel Sheet: ASTM A 240/A 240M Type 304, dead soft, fully annealed; with smooth, flat surface.
   1. Finish: 2D (dull, cold rolled).

C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation, Grade 40 (Grade 275); prepainted by coil-coating process to comply with ASTM A 755/A 755M.
   1. Surface: Smooth, flat.
   2. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Color: As selected by Architect from manufacturer's full range.
   4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
   1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
      a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
   2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
   3. Fasteners for Zinc-Coated (Galvanized) Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.


2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
H. Do not use graphite pencils to mark metal surfaces.

2.5 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.3 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200
SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer’s color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturing
   a. Sika Corporation
   b. Sonneborn Building Products
   c. Tremco, Inc.
   d. W.R. Meadows, Inc.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability traffic and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturing
   a. Sika Corporation
   b. Sonneborn Building Products
   c. Tremco, Inc.
   d. W.R. Meadows, Inc.

2.4 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers:
   a. Pecora Corp.
   b. Protective Treatments, Inc.
   c. Tremco, Inc.
2.5 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. 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.

B. 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 joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

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.

2. Clean porous joint substrate surfaces by brushing, grinding, 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 after cleaning
operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.

3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Glass.
b. Porcelain enamel.
c. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer’s written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form
smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.

   a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:
   b. Control and expansion joints in tile flooring.
   c. Other joints as indicated on Drawings.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.


1. Joint Locations:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Tile control and expansion joints.
   c. Vertical joints on exposed surfaces of unit masonry and concrete.
   d. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:
   a. Control joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   c. Other joints as indicated on Drawings.

3. Joint-Sealant Color: As selected by Architect from manufacturer’s full range of colors.

END OF SECTION 079200
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Interior standard steel doors and frames.
   2. Exterior standard steel doors and frames.

B. Related Requirements:
   1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers

1. Amweld International
2. Ceco Door
3. Curries Company
4. Deansteel Manufacturing
5. Fleming Door Products, Ltd.
6. Messer Door, Inc.
7. Republic Doors and Frames
8. Steelcraft
9. Metal Products, Inc., Corbin, Kentucky
2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

B. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.50 deg Btu/F x h x sq. ft. (2.84 W/K x sq. m) when tested according to ASTM C 518.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4; SDI A250.4, Level A.

1. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches (44.5 mm).
   c. Face: Uncoated steel sheet, minimum thickness of 0.067 inch (1.7 mm).
   d. Edge Construction: Model 1, Full Flush.
   e. Core: Kraft-paper honeycomb.
   f. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.

2. Frames:
   a. Materials: Uncoated steel sheet, minimum thickness of 0.067 inch (1.7 mm).
   b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
   c. Construction: Knocked down.


2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4; SDI A250.4, Level A.

1. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches (44.5 mm).
   c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch (1.7 mm), with minimum A40 (ZF120) coating.
   d. Edge Construction: Model 2, Seamless.
   e. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
   f. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

g. Core: Polystyrene.

2. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (1.7 mm), with minimum A40 (ZF120) coating.
   b. Construction: Knocked down.


2.5 FRAME ANCHORS

A. Jamb Anchors:
   1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
   2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
   3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.6 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.7 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with stops unless otherwise indicated.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 LOUVERS

A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with SDI A250.11 or NAAMM-HMMA 840.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
   a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
   b. Install frames with removable stops located on secure side of opening.

2. Fire-Rated Openings: Install frames according to NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.
a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

4. Solidly pack mineral-fiber insulation inside frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8 or AAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113
SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Solid-core doors with wood-veneer faces.
   2. Factory finishing flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:
   1. Section 088000 "Glazing" for glass view panels in flush wood doors.
   2. Section 08710000 "Door Hardware" for door hardware for flush wood doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
   1. Dimensions and locations of blocking.
   2. Dimensions and locations of mortises and holes for hardware.
   3. Dimensions and locations of cutouts.
   4. Undercuts.
   5. Requirements for veneer matching.
   6. Doors to be factory finished and finish requirements.
   7. Fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:
   1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

1.7 WARRANTY

A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.

   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.


PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers

   1. Algoma Hardwoods, Inc.
   2. Egger Industries
   3. Graham Wood Doors
   4. Lambton Doors
   5. Marshfield Door Systems
   6. Mohawk Flush Doors, Inc.
   7. Oshkosh Door Company

B. Source Limitations: Obtain flush wood doors from single manufacturer.
2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."

B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

D. Particleboard-Core Doors:

2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
   a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
   b. 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
   c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
   d. The requirements above are minimums. Coordinate with door hardware.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: Select white birch and Red oak options.
3. Cut: Plain sliced (flat sliced).
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 20 feet (6 m) or more.
8. Exposed Vertical and Top Edges: Same species as faces or a compatible species - edge Type A.
10. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
11. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   1. Comply with NFPA 80 requirements for fire-rated doors.

B. 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, BHMA-156.115-W, and hardware templates.
   1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Openings: Factory cut and trim openings through doors.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:
   1. Grade: Premium.
   2. Finish: WDMA TR-6 catalyzed polyurethane.
   3. Staining: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.
   1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that 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 081416
SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary
      Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section includes access doors and frames for walls and ceilings.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.
      1. Include construction details, fire ratings, material descriptions, dimensions of individual
         components and profiles, and finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
   A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and
      labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings
      indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES
   A. Flush Access Doors with Exposed Flanges:
      1. Manufacturers:
         a. Acudor Products, Inc.
         b. Babcock-Davis
         c. JL Industries
         d. Larsens
         e. or approved equal

         2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
         3. Locations: Wall and ceiling.
         4. Door Size: 12” x 12” minimum. Coordinate with trades.
         5. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage factory finished.
         6. Frame Material: Same material, thickness, and finish as door.
8. Provide detention grade panels in detention areas.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, [Type 304] [Type 316]. Remove tool and die marks and stretch lines, or blend into finish.

E. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063.

F. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

G. Frame Anchors: Same material as door face.

H. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.
3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer’s written instructions for cleaning, conversion coating, and applying and baking finish.

   1. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

      a. Color: As selected by Architect from full range of industry colors.

PART 3 - EXECUTION

3.1 EXAMINATION

   A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

   B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

   A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

   A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113
SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Storefront framing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
   a. Joinery, including concealed welds.
   b. Anchorage.
   c. Expansion provisions.
   d. Glazing.
   e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.4 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

B. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures, including, but not limited to, excessive deflection.
   b. Noise or vibration created by wind and thermal and structural movements.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   d. Water penetration through fixed glazing and framing areas.
   e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing spandrel panels and accessories, from single manufacturer.
2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:
   a. Thermal stresses transferring to building structure.
   b. Glass breakage.
   c. Noise or vibration created by wind and thermal and structural movements.
   d. Loosening or weakening of fasteners, attachments, and other components.
   e. Failure of operating units.

B. Structural Loads:

1. Wind Loads: As indicated on Drawings.

C. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch (3.2 mm).
   a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.

3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
   a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 11 feet 8-1/4 inches (3.6 m) or 1/175 times span, for spans of less than 11 feet 8-1/4 inches (3.6 m).

D. Structural: Test according to ASTM E 330/E 330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:
a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

2. Entrance Doors:
   a. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

G. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) as determined according to NFRC 100.
2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater than 0.35 as determined according to NFRC 200.
3. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.

H. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.


I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
   a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
   b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
   c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).

2.3 STOREFRONT SYSTEMS

A. Manufacturers:
   1. EFCO Corporation
   2. Kawneer North America
   3. Old Castle Building Env.
   4. Trulite Glass & Aluminum
   5. Tubelite, Inc.
   6. U.S. Aluminum
B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

2. Interior Vestibule Framing Construction: Nonthermal.
6. Fabrication Method: Field-fabricated stick system.
7. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
8. Steel Reinforcement: As required by manufacturer.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer’s standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Insulated Spandrel Panels: Laminated, metal-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.

1. Overall Panel Thickness: 1 inch (25.4 mm).
2. Exterior Skin: Aluminum.
   a. Thickness: Manufacturer's standard for finish and texture indicated.
   b. Finish: Match framing system.
   c. Texture: Smooth.
   d. Backing Sheet: 1/8-inch- (3.2-mm-) thick tempered hardboard.
3. Interior Skin: Aluminum.
   a. Thickness: Manufacturer's standard for finish and texture indicated.
   b. Finish: Mill finish.
   c. Texture: Smooth.
   d. Backing Sheet: 1/8-inch- (3.2-mm-) thick tempered hardboard.
4. Thermal Insulation Core: Manufacturer's standard rigid, closed-cell, polyisocyanurate board.
5. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 50.

2.4 ENTRANCE DOOR SYSTEMS

A. Manufacturers: Match storefront systems.

B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Door Construction: 2-inch (50.8-mm) overall thickness, with minimum 0.188-inch- (4.8-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten
corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

2. Door Design: Wide stile; 5-inch (127-mm) nominal width.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware".

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."
B. Glazing Gaskets: Comply with Section 088000 "Glazing."
C. Glazing Sealants: Comply with Section 088000 "Glazing."
D. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.


2.7 MATERIALS

A. Sheet and Plate: ASTM B 209 (ASTM B 209M).
B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
D. Structural Profiles: ASTM B 308/B 308M.
E. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends cope or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for assembly using head-and-sill-receptor system with shear blocks at intermediate horizontal members.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions, to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
   1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
   2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
   2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
      c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
   4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

END OF SECTION 084113
SECTION 085653 - SECURITY WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fixed, transaction security windows.

1.3 COORDINATION

A. Coordinate installation of anchorages for security windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, weights and finishes for window units.

B. Shop Drawings: For security windows.

1. Include plans, elevations, sections, and attachment details.
2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
4. Details of transaction drawer and speaking aperture.

C. Samples for Initial Selection: For frame members with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of sizes indicated below:

1. Framing: 12-inch- (305-mm-) long sections of frame members.
2. Transaction Drawer: 6 inches (150 mm) square.
1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of security window and accessory indicated as ballistics or forced-entry resistant, for tests performed by a qualified testing agency.

B. Sample Warranty: For special warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Pack security windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.

B. Label security window packaging with drawing designation.

C. Store crated security windows on raised blocks to prevent moisture damage.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace security windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including deflections exceeding 1/4 inch (6 mm).
   b. Failure of welds.
   c. Faulty operation of transaction drawers.
   d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Attack Resistance: Provide units identical to those tested for compliance with requirements indicated, and as follows:

   1. Ballistics Resistance: Listed and labeled as Level 2 minimum when tested according to UL 752.
   2. Forced-Entry Resistance: Level II minimum when tested according to HPW-TP-0500.03.
2.2 FIXED, TRANSACTION SECURITY WINDOWS

A. Provide fixed, transaction security windows with operable sash or ventilator capable of allowing transfer of currency and documents.

1. Manufacturers:
   a. Laurence, C.R. Co., Inc.
   b. National Bullet Proof, Inc.
   c. Quickserv Corp (Basis of Design – QSP-713S Mini)

B. Configuration: One fixed-glazed panel as indicated at end of spec.

C. Framing: Fabricate perimeter framing, mullions, and glazing stops from stainless steel and aluminum as follows:

   1. Profile: Manufacturer's standard, with minimum face dimension indicated.
   2. Depth: As indicated on Drawings.

D. Channel-Frame Sill: Formed from stainless steel and designed for sealant glazing.

E. Materials:

   1. Mild Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
   2. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
   3. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
   4. Aluminum Extrusions: ASTM B 221 (ASTM B 221M). Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength.

2.3 FABRICATION

A. General: Fabricate security windows to provide a complete system for assembly of components and anchorage of window units.

   1. Provide units that are reglazable from the secure side without dismantling the attack side of framing.
   2. Prepare security windows for field glazing unless preglazing at the factory is indicated.

B. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.

   1. Fabricate framing with manufacturer's standard, internal opaque armoring in thicknesses required for security windows to comply with ballistics-resistance performance indicated.

C. Glazing Stops: Finish glazing stops to match security window framing.

   1. Attack-Side (Exterior) Glazing Stops: Welded or integral to framing.

D. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration.
of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

E. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.6 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

2.7 ACCESSORIES

A. Transaction Drawers: Formed from stainless steel with ball-bearing, telescoping sliding mechanism; with cover on secure side of top of drawer that automatically closes when drawer is extended to attack side.

1. Inside Dimensions: 15-3/8 inches wide by 8-1/2 inches deep by 4-3/8 inches high (390 mm wide by 216 mm deep by 111 mm high) minimum.
3. Ballistics Resistance: Same as security window

B. Speaking Apertures: Provide call button and speakers. Coordinate electrical connection.

C. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

D. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers and with a proven record of compatibility with surfaces contacted in installation.
1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
2. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
3. 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.
4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

E. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633; provide sufficient strength to withstand design pressures indicated.

F. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of security windows.

B. For factory-installed glazing materials whose orientation (secure or attack side) is critical for performance, verify installation orientation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing security windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.

B. Removable Glazing Stops and Trim: Fasten components with security fasteners.

C. Fasteners: Install security windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel fasteners in stainless-steel materials.

D. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.

1. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction unless otherwise indicated.
2. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.

E. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in
writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.3 ADJUSTING

A. Adjust transaction drawers to provide a tight fit at contact points for smooth operation and secure enclosure.

B. Remove and replace defective work, including security windows that are warped, bowed, or otherwise unacceptable.

3.4 CLEANING AND PROTECTION

A. Clean surfaces promptly after installation of security windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
   1. Lubricate transaction drawer hardware.

B. Provide temporary protection to ensure that security windows are without damage at time of Substantial Completion.

END OF SECTION 085653
SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following swinging doors:
   a. Aluminum.
   b. Hollow metal.
   c. Flush wood.

2. Key cylinders for doors specified in other Sections.

3. Electrified access control door hardware. See Door Hardware Schedule and Door-Set Numbering Index (this Section) for hardware sets prefixed with "E". See electrical specifications for additional electrical work and materials required.

B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. KENTUCKY BUILDING CODE.

1.3 SUBMITTALS

A. Number of Submittals: All items listed in this section are to be included in one submittal prepared by one Supplier.

B. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Samples for Verification: For exposed door hardware of each type, in specified finish, full size, as requested by Architect. Tag with full description for coordination with the door hardware sets. Submit Samples before, or concurrent with, submission of the final door hardware sets.

   1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
D. Qualification Data:

1. Finish Hardware Installers
   a. Finish hardware, including electrified hardware, for wood, hollow metal, and aluminum doors to be installed by personnel trained and certified by the manufacturer of the product furnished.
   b. Provide manufacturer’s certificates for installer as part of Contractor’s bid information. Failure to supply certificates may result in rejection of bid.

2. Hardware Supplier
   a. Established contract hardware firm which maintains and operates an office, display, and stock in project area and which is a factory authorized distributor of the lock being furnished.
   b. Hardware scheduled and furnished by or under direct supervision an Architectural Hardware Consultant.
   c. All schedules submitted to the Architect for approval and job use must carry the signature and certified seal of this Architectural Hardware Consultant.

3. Architectural Hardware Consultant
   a. Currently certified by the Door and Hardware Institute.
   b. Full-time employee of the Hardware Supplier or an individual having no contractual ties to any supplier/manufacturer entity.
   c. Available at reasonable times to Architect, Owner, and Contractor during course of work.

E. Maintenance Data: For each type of door hardware. Include final hardware schedule, keying schedule, riser diagrams, and point-to-point wiring diagrams in 3-ring binder, labeled on spine with project name and “Door Hardware”.

F. Warranty: Special warranty specified in this Section.

G. Other Action Submittals:

1. Door Hardware Sets: Prepared by or under the supervision of a DHI certified Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   a. Format: Comply with scheduling sequence and vertical format in DHI’s "Sequence and Format for the Hardware Schedule"; other formats will be rejected without review. Double space entries, and number and date each page.
   b. Numerical Sequence of Sets and Headings: Submittal headings shall be in exact order as hardware sets in specification: one heading only per set. Submittal set numbers shall relate to specification set numbers, i.e. if three headings are required for Set 12 due to door width differences, then the heading numbers should be 12.1, 12.2, and 12.3 or employing similar linking logic.
   c. Door Numbers: Identical to those used in the contract documents.
   d. Number of Copies: (5).
   e. Content: Include the following information:
      1) Identification number, location, hand, fire rating, and material of each door and frame.
      2) Type, style, function, size, quantity, and finish of each door hardware item.
3) Complete designations of every item required for each door or opening including name and manufacturer.
4) Degree of opening for closer and overhead stop and holder installation.
5) Keying information.
6) Fastenings and other pertinent information.
7) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
8) Explanation of abbreviations, symbols, and codes contained in schedule.
9) Mounting locations for door hardware.
10) Notes included with specification hardware sets transcribed verbatim into submittal hardware sets.
11) Door and frame sizes and materials.
12) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
   a) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
13) List of related door devices specified in other Sections for each door and frame.

f. Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.

2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.4 QUALITY ASSURANCE

A. Furnish proper hardware types and quantities for door function, hardware mounting and clearances, and to meet applicable codes. Bring discrepancies to the attention of the Architect a minimum of (10) days prior to bid date so that an addendum may be issued. No additional compensation will be allowed after bidding for hardware changes required for proper function, hardware mounting or clearances, or to meet codes.

B. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

C. Source Limitations: All items listed in hardware sets are to be furnished by one supplier. Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
D. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:

1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
   a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
   b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
      2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
   c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
3. NFPA 101: Comply with the following for means of egress doors:
   a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
   b. Thresholds: Not more than 1/2 inch high.
4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40” above sill) or UL-10C.
   a. Test Pressure: Positive pressure labeling.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Conference is to include representatives of the Owner, Architect, Contractor, CM if applicable, Hardware Supplier, and Manufacturer of Key Cylinders. Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Access Control Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Conference is to include representatives of the Owner, Architect, Contractor, CM if applicable, and Access Control (or Security) Supplier. Access control conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future access control system expansion.
3. Requirements for access control storage of credentials and software.
4. Assignment and distribution of permanent access control credentials, badging equipment, and software.
5. Access control privilege assignments including doors, time schedules, users, user groups, special credential functions, etc.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to project site.

B. Deliver hardware for aluminum doors to GC in timely manner so as not to delay fabrication of aluminum doors and frames. Balance of hardware may be delivered to GC at same time, packaged separately from aluminum door hardware, and may be billed as stored materials.

C. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

D. Deliver keys to Owner by registered mail or overnight package service. Obtain Owner’s contact name and address from Architect.

1.6 COORDINATION

A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Distribute templates in a timely manner so as not to delay suppliers. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, and security system.

C. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.
C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Ten years for manual door closers.
4. Two years for electromechanical and integrated access control door hardware.
5. Five years for motorized electric latch retraction exit devices.

1.8 MAINTENANCE SERVICE

A. 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.

B. Maintenance Service: Beginning at Substantial Completion, provide (6) months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.

B. Designations: Requirements for design, grade, function, material, finish, size and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.

2. References to BHMA Standards: In addition to other requirements in this section, provide products complying with or exceeding these standards and requirements for description, quality, and function.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electrified access control door hardware, in compliance with specifications, must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01 "Substitution Procedures". Approval of requests is at the discretion of the architect, owner, and their designated consultants.
D. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include manufacturers specified.

2.2 BUTT HINGES, GENERAL

A. Quantity: Provide the following, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
3. Four Hinges: For doors with heights 91 to 120 inches (2311 to 3048 mm).
4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).

B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

C. Hinge Height, Width, and Weight: Unless otherwise indicated, provide the following:

1. Doors with Exit Devices or 3'6" or more in width: 5" high, heavy-weight hinges.
2. Doors less than 3'6" in width: 4-1/2" high, standard-weight hinges.
3. Width: 4-1/2" heavy-weight, 4" standard-weight, unless proper clearance requires a different width.

D. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior and in-swinging restroom door hinges: Stainless steel, with stainless-steel pin.
2. Balance of hinges: Steel, with steel pin.

E. Hinge Options: Provide the following:

1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for reverse bevel lockable doors.
2. Corners: Square.
3. Number of knuckles: Five.

F. Fasteners: Comply with the following:

2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.

G. Template Hinge Dimensions: BHMA A156.7.

H. Available Manufacturers:

2. Hager Companies (HAG).
3. McKinney Products Company; an ASSA ABLOY Group company (MCK).
4. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
5. PBB, Inc. (PBB)

2.3 ELECTRIC STRIKES

A. Surface Mounted Rim Panic Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

1. Acceptable Manufacturers:
   a. HES (HES) - 9500/9600 Series.
   b. Trine (TRN) - 4850 Series.
   c. Von Duprin (VON) - 6300 Series.

B. Provide electric strikes with in-line (MOV) surge suppressors.

2.4 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. Adjustable biased DPDT contacts as specified.

1. Acceptable Manufacturers:
   a. Flair Electronics (FLR).

B. Electronic Power Transfers:

1. Concealed: For new doors and frames, concealed when door is closed. All metal construction, cast housing with steel backboxes, two universal joints and rigid tubing. Acceptable Manufacturers:
   a. Security Door Controls (SDC).
   b. Securitron Door Controls (SEC).
   c. Architectural Builders Hardware (ABH).
   d. Hager (HAG).
   e. Von Duprin (VON).

C. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Acceptable Manufacturers:
a. Security Door Controls (SDC).
b. Securitron Door Controls (SEC).
c. Dortronics (DOR).
e. Altronix (ALT).
f. Schlage Electronics (SCE).
g. Von Duprin (VON)

h. **Note:** The above manufacturers are not acceptable when the item being powered requires a power supply manufactured by a manufacturer not listed above to maintain its warranty.

2.5 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lb (22 N).

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lb (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Electrified Locking Devices: BHMA A156.25. Equal in all characteristics to model specified.

1. Available Manufacturers:
   b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
   c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
   d. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

D. Lock Trim:

1. Levers: Cast.
   a. Schlage 17 model with full smooth return.

2. Roses: Forged.
   a. Schlage A model.

3. Lockset Designs: Provide design indicated in hardware sets, or, if sets are provided by another manufacturer, provide designs that match those designated.

E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:


2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

F. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

G. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:
2. Strikes for Auxiliary Deadlocks: BHMA A156.5.

2.6 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:


B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13 Grade 1.

1. Available Manufacturers:
   b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
   c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
   d. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

C. Compatibility with Key Cylinders: fully warranted for use with key cylinder furnished.

2.7 AUXILIARY LOCKS AND LATCHES

A. Auxiliary Locks: BHMA A156.5, Grade 1.

1. Available Manufacturers:
   b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
   c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
   d. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.8 DOOR BOLTS

A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:


B. Manual Flush Bolts: BHMA A156.16, Grade 1; designed for mortising into door edge.

1. Available Manufacturers:
   a. Door Controls International (DCI).
   b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
   c. Hager Companies (HAG).
   d. IVES Hardware; an Ingersoll-Rand Company (IVS).
   e. McKinney Products Company; an ASSA ABLOY Group company (MCK).
   f. Rockwood Manufacturing Company (RM).
   g. Trimco (TBM).
2.9 EXIT DEVICES

A. Exit Devices: BHMA A156.3, Grade 1.

B. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).

C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

F. Fasteners. Manufacturer’s standard, except furnish sex bolts for attachments to doors.

G. Shims: Provide shims if needed for clearance.

H. Available Manufacturers:

1. Von Duprin; an Ingersoll-Rand Company (VON). No substitutes allowed.

2.10 KEY CYLINDERS

A. Standard Lock Cylinders: UL437.

B. Cylinders: Provide cylinders for all devices requiring key cylinders to properly function: constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Six or seven as directed by Owner.
2. Keyway: Patented or non-patented as directed by Owner.
3. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
4. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

C. Construction Keying: Comply with the following:


D. Supplemental Items: Provide cylinder spacers, collars, and correct cams as needed for proper function of locking devices.
E. Available Manufacturers:

2. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
3. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
4. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.11 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:

1. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
   a. Notation: "DO NOT DUPLICATE."

2. Quantity: Provide the following:
   b. Master Keys: Six per master.
   c. Grand Master Keys: Six.
   e. Control Keys: Two.
   f. Construction Control Keys: Two.
   g. Blanks: Fifty.

2.12 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.5, Grade 1; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

1. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
2. Locate and mount per direction of Architect.

B. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook.

1. Available Manufacturers:
   a. Lund Equipment Co., Inc. (LUN).
   b. MMF Industries (MMF).
   c. Telkee; a division of Sunroc Corporation (TEL).
2.13 OPERATING TRIM

A. Materials: Fabricate from stainless steel, unless otherwise indicated.

B. Dimensions: All dimensions, shapes, fasteners, and other properties identical to models specified in hardware sets.

C. Push Plates:
   1. 0.125" thick, Type 304 solid stainless steel, 4" or 8" wide as indicated by model number in hardware sets, 16" high (unless stile width requires different width), heavy bevel all (4) edges, 3/8" radius rounded corners, factory prepped for key cylinders and thumb-turns as required.
   2. Dimensions:
      a. Top of plate to horizontal centerline of key cylinder: 5".
      b. Horizontal centerline of key cylinder to horizontal centerline of thumb-turn: as required per dimension of lock model.
      c. Lock-side edge of plate to vertical centerline of key cylinder: 2".

D. Pull Plates:
   1. Plate: 0.050" thick, 4" wide x 16" high (unless stile width requires different width), bevel all (4) edges, 3/8" radius rounded corners, factory prepped for key cylinders and thumb-turns as required.
   2. Grip: 1" wide, 8" CTC, Type 304 solid stainless steel, half-moon profile.
   3. Dimensions:
      a. Top of plate to horizontal centerline of key cylinder: 2".
      b. Horizontal centerline of key cylinder to horizontal centerline of thumb-turn: as required per dimension of lock model.
      c. Edge of plate to vertical centerline of key cylinder and grip: 2".
      d. Top of plate to horizontal centerline of grip: 10".

E. Available Manufacturers:
   1. Hager Companies (HAG).
   2. Hiawatha (HIW).
   4. IVES Hardware; an Ingersoll-Rand Company (IVS).
   5. Rockwood Manufacturing Company (RM).
   6. Trimco (TBM).

2.14 SURFACE CLOSERS

A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

   1. Comply with the following maximum opening-force requirements:
      a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
      b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.

C. Fasteners: Manufacturer’s standard for arms, shoes and brackets. Sex bolts for fastening closers to doors.

D. Mounting Accessories: Provide shoes, brackets, drop plates, spacers, etc., as needed for proper mounting of closers and arms to door and frame.

E. Spring Size of Units: Provide field-size closers, adjustable for spring sizes 1-6, plus 50% extra spring power at spring size 6, to meet field conditions and requirements for opening force.

F. Cylinders: 1-1/2" minimum diameter; cast iron or high-silicon alloy aluminum.

G. Available Manufacturers and Series for Cam and Roller Surface Closers:
   1. Dorma (DOR); TS9315 series.
   2. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT): 421-CT series.
   3. Norton Door Controls; an ASSA ABLOY Group company (NOR): 2800ST series.

H. Available Manufacturers and Series for Rack and Pinion Surface Closers:
   1. LCN Closers; an Ingersoll-Rand Company (LCN): 4040XP series.
   2. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT): 281 or 351 series.

2.15 PROTECTIVE TRIM UNITS

A. Size:
   1. Width
      a. Singles, and pairs with removable mullions or surface applied astragals: 2 inches (38 mm) less than door width on push side and 1 inch (13 mm) less than door width on pull side
      b. Other pairs: 1 inch (13 mm) less than door width
   2. Height: as specified in door hardware sets; or, if constrained by door bottom rail height, 1" less bottom rail height.

B. Fasteners: Manufacturer's machine or self-tapping countersunk screws.

C. Metal Protective Trim Units: BHMA A156.6; beveled 4 sides; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel.

D. Available Manufacturers:
   1. Hager Companies (HAG).
   2. IVES Hardware; an Ingersoll-Rand Company (IVS).
   3. Hiawatha (HIW).
   4. Burns (BRN).
5. Rockwood Manufacturing Company (RM).
6. Trimco (TBM).

2.16 MECHANICAL WALL STOPS AND HOLDERS

A. Stops and Bumpers: BHMA A156.16, Grade 1.

1. Provide wall stops for doors unless floor, overhead, or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Provide floor stops (and spacers if needed) of proper height and configuration to accommodate floor condition. Where floor or wall stops are not appropriate, provide overhead holders.

2. Properties. Cast construction with fastener suitable for wall or floor condition.

3. Available Manufacturers:
   a. Hager Companies (HAG).
   b. IVES Hardware; an Ingersoll-Rand Company (IVS).
   c. Hiawatha (HIW).
   d. Burns (BRN).
   e. Rockwood Manufacturing Company (RM).
   f. Trimco (TBM).

B. Wall mounted Combination Door Stops and Holders: BHMA A156.16, Grade 1.

1. Properties: Heavy cast with adjustable holding force, self-compensating for changes up to ¼" in vertical door position. Provide flush spacers finished to match adjoining substrates for clearance as needed.

2. Manufacturer and Model: Trimco 1283.

2.17 OVERHEAD STOPS AND HOLDERS

A. BHMA A156.8, Grade 1. Template for maximum degree of opening before encountering obstruction.

B. Available Manufacturers:

1. Architectural Builders Hardware Mfg., Inc. (ABH).
2. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
3. Hager (HAG).
4. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
5. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

2.18 SILENCERS

A. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

B. Available Manufacturers:

2. Hager Companies (HAG).
3. IVES Hardware; an Ingersoll-Rand Company (IVS).
4. McKinney Products Company; an ASSA ABLOY Group company (MCK).
5. Rockwood Manufacturing Company (RM).
6. Trimco (TBM).

2.19 DOOR GASKETING

A. General: Provide continuous weather-strip gasketing on exterior hollow metal doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners as indicated by models in hardware sets.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. If hardware is to be attached to the frame and would interfere with the gasketing, then provide hardware compatible gasketing that does not need to be cut for the mounting of hardware.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Mullion Gasketing: Fasten to mullions, forming seal when doors are closed.
4. Sweeps: Apply to bottom of in-swinging exterior hollow metal doors, or as required for sound attenuation, forming seal with threshold or floor when door is closed.
5. Seals integral to threshold at out-swinging exterior hollow metal doors.

B. Requirements per type of rated door provided (these requirements supersede models indicated in hardware sets):

1. Category A wood doors: provide models indicated in hardware sets.
2. Category B wood doors: provide Category G&H seals at jambs and meeting edges. If Category H seals are indicated in hardware sets, provide Cat G seals in addition to the Category H seals.
3. Category A and B hollow metal doors: provide models indicated in hardware sets.

C. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

D. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.

1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.

E. Fire-Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 or UBC Standard 7-2.

1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1016 mm) or less above the sill.

F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

G. Mullion Gasketing: Sealing up to 1/4" gaps, 4 vanes, adhesive backed, collapsible to 1/32", black.

Basis of Design: DHSI (DHS) Model MS-SA/75 x BK.

H. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

I. Jamb Gasketing Materials:
1. Adhesive Seals. As specified in hardware sets or approved equal.
2. Intumescents: As required.

J. Available Manufacturers for Jamb Gaskets (provided they provide items with neoprene inserts):
   1. Hager Companies (HAG).
   2. National Guard Products (NGP).
   4. Reese Enterprises (REE).
   5. Zero International (ZER).

2.20 THRESHOLDS

A. Standard: BHMA A156.21

B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board’s "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
   1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch (13 mm) high.

D. Fasteners: ¼-20 machine screws and expansion anchors.

E. Gasketing material: At panic-type thresholds: neoprene.

F. Available Manufacturers (provided they provide items with neoprene inserts):
   1. Hager Companies (HAG).
   2. National Guard Products (NGP).
   4. Reese Enterprises (REE).
   5. Zero International (ZER).

2.21 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
   1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and
BHMA A156.18. Do not furnish manufacturer’s standard materials or forming methods if different from specified standard.

2.22 FINISHES

A. Standard: BHMA A156.18, as indicated in door hardware sets.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 Series.
   1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

B. Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
   2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
   4. Push Plates: Top edge of plate: 53"AFF.
5. Pull Plates: Top edge of plate: 50" AFF. Centerline of Grip: 40" AFF.
6. Key Cylinders for Auxiliary Deadbolts: 48" AFF.

B. Mounting Locations:
   1. Wall Stops: Locate so that lockset spindle and wall stop share horizontal and vertical centerlines.
   2. Wall Stop/Holders: Locate 4" down and in from top lock-edge corner of door w/holder slot at bottom of unit.
   3. Closers and Overhead Stop/Holders: Template and mount closers and overhead stops for maximum degree of opening before door encounters obstruction or so as to interface with specified wall stops and holders. When used with closers, template and locate overhead stops so that closer arm does not fully extend and bottom out. These functionality requirements override any degree of opening information in the specifications or submittals.

C. Install each door hardware item to comply with manufacturer’s written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
   1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
   2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

D. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule. Document cross-indexing per manufacturer’s instructions.

E. Boxed Power Supplies: Locate power supplies as directed by Architect.

F. Weatherstrip and Gasketing with Metal Retainers: Fit up as needed for neat appearance with no gaps between retainers or bulbs.

G. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants." Position for complete seal with bottom of doors with no penetration of air or daylight.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

B. Overhead Stops/Holders: Set adjustable stops for maximum degree of opening before door encounters obstruction. Adjust friction to control door.

C. Wall Mounted Stop/Holders: Adjust holding force with spanner head wrench so that door is held securely, yet is easy to pull out of hold open.
D. Door Closers:

1. Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

2. Adjust latch period so that door does not slam nor injure fingers.

3. Adjust spring power so that door properly latches.

4. Adjust backcheck to slow door down before hitting stop point so as to prevent damage to closer, arm, door, frame, and fasteners.

E. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE

Note 1: See Part 2 Door Gasketing for requirements regarding Category G and Category H seals per type of rated door provided.

Note 2: Hardware Sets with electrified door hardware of any kind are prefixed with the letter “E” to aid in reference. Sets not prefixed with “E” do not have any electrified door hardware. See electrical specifications for additional information.

Hardware Set E01 – Door 108

<table>
<thead>
<tr>
<th>Hardware Component</th>
<th>Model/Code</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butt Hinges, Security Studs, NRP</td>
<td>BB5006-545-A</td>
<td>3</td>
</tr>
<tr>
<td>Jamb-to-Door Power Transfer</td>
<td>EPT-10</td>
<td>1</td>
</tr>
<tr>
<td>Double-cylinder Deadbolt</td>
<td>L462</td>
<td>1</td>
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<tr>
<td>Electric Mortise Lockset</td>
<td>L9095EU-17A</td>
<td>1</td>
</tr>
<tr>
<td>Mortise Cylinder</td>
<td>UL437</td>
<td>1</td>
</tr>
<tr>
<td>Power Supply</td>
<td>PS902</td>
<td>1</td>
</tr>
<tr>
<td>Lock Guard, Mortise Lock</td>
<td>5000T</td>
<td>1</td>
</tr>
<tr>
<td>Closer, w/Spring Stop</td>
<td>4040XP SCUSH</td>
<td>1</td>
</tr>
<tr>
<td>Overhead Rain Drip</td>
<td>16A</td>
<td>1</td>
</tr>
<tr>
<td>Cat H Adhesive Jamb Seal Set</td>
<td>2525B</td>
<td>1</td>
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<tr>
<td>Kick Plate</td>
<td>KO050 8 x 2LDW x CS x B4E</td>
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<tr>
<td>Panic Threshold</td>
<td>896N x RCE</td>
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<tr>
<td>Door Contact, Pop-in, DPDT</td>
<td>MSS100-4Y</td>
<td>1</td>
</tr>
<tr>
<td>Card Reader (single-gang) and Control Electronics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Electric mortise lockset is fail secure; levers on both sides are normally in locked condition.

Note 1: Provide 115VAC, 60Hz, 1A service to power supply. Provide conduit with pull strings from electric mortise lockset and door position switch to power supply.
System Function: Door is not a required exit. Ingress and egress by valid card from either side of door or from podium or by mechanical key override. Deadbolt is for locking when the building is unoccupied for an extended time period.
### Hardware Set E02 – Door 110

<table>
<thead>
<tr>
<th>Item</th>
<th>Model/Part No.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3) Butt Hinges, Security Studs, NRP</td>
<td>BB5004-545-A</td>
<td></td>
</tr>
<tr>
<td>(1) Jamb-to-Door Power Transfer</td>
<td>EPT-10</td>
<td></td>
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<tr>
<td>(1) Delayed Egress Panic Device</td>
<td>CX99NL x 697NL</td>
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<td>Note: Panic device has integral delayed egress system.</td>
</tr>
<tr>
<td>(1) Power Supply</td>
<td>PS904</td>
<td>VON</td>
</tr>
<tr>
<td>(1) Rim Cylinder</td>
<td>UL437</td>
<td>626</td>
</tr>
<tr>
<td>(1) Mortise Cylinder</td>
<td>UL437</td>
<td>626</td>
</tr>
<tr>
<td>(1) Rim Panic Strike</td>
<td>9600 x 9500/9600-108</td>
<td>630</td>
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<tr>
<td>(1) Closer, w/Spring Stop</td>
<td>4040XP SCUSH</td>
<td>689</td>
</tr>
<tr>
<td>(1) Kick Plate</td>
<td>KO050 8 x 2LDW x CS x B4E</td>
<td>630</td>
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<tr>
<td>(1) Door Contact, Pop-in, DPDT</td>
<td>MSS100-4Y</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FLR</td>
</tr>
<tr>
<td>(3) Card Reader (single-gang) and Control Electronics (see electrical specifications)</td>
<td></td>
<td></td>
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</tbody>
</table>

**Note 1:** Provide 115VAC, 60hz, 1A service and fire alarm hookup to power supply. Provide conduit with pull strings from panic device and door position switch to power supply.

**System Function:** Delayed egress system is normally enabled. Egress without alarm by card on push side of opening or from podium, by fire alarm, or by power failure. Ingress by card on pull side of opening or from podium which releases electric strike.

### Hardware Set E03 – Door 106

<table>
<thead>
<tr>
<th>Item</th>
<th>Model/Part No.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3) Butt Hinges</td>
<td>BB5000-454-A</td>
<td>652</td>
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<tr>
<td>(1) Jamb-to-Door Power Transfer</td>
<td>EPT-10</td>
<td>VON</td>
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<tr>
<td>(1) Thumb-turn Deadbolt</td>
<td>L460</td>
<td>626</td>
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<tr>
<td>(1) Electric Mortise Lockset</td>
<td>L9092EU-17A x RX</td>
<td>626</td>
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<tr>
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<td>Note: Electric mortise lockset is fail secure; lever on push side is normally in locked condition; inside lever is always free for egress.</td>
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<tr>
<td>(2) Mortise Cylinder</td>
<td>UL437</td>
<td>626</td>
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<tr>
<td>(1) Lock Guard, In-swinging</td>
<td>ILP 212 - CP</td>
<td>652</td>
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<tr>
<td>(1) Power Supply</td>
<td>PS902</td>
<td>VON</td>
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<tr>
<td>(1) Closer, Regular Arm</td>
<td>4040XP Reg</td>
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<td>(1) Kick Plate</td>
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<tr>
<td>(1) Wall Stop/Holder</td>
<td>1283-6S</td>
<td>626</td>
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<tr>
<td>(1) Door Contact, Pop-in, DPDT</td>
<td>MSS100-4Y</td>
<td>White</td>
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<td>FLR</td>
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<tr>
<td>(1) Card Reader (single-gang) and Control Electronics (see electrical specifications)</td>
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</tbody>
</table>

**Note 1:** Provide 115VAC, 60hz, 1A service to power supply. Provide conduit with pull strings from electric mortise lockset and door position switch to power supply.

**System Function:** Free egress by inside lever. Ingress by valid card from push side of door or by mechanical key override. Deadbolt is for locking when the building is unoccupied for an extended time period.
### Hardware Set E04 – Door 101

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Part Number</th>
<th>BOM Code</th>
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<tbody>
<tr>
<td>Butt Hinges</td>
<td>BB5000-454-A</td>
<td>652</td>
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<tr>
<td>Jamb-to-Door Power Transfer</td>
<td>EPT-10</td>
<td>VON</td>
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<tr>
<td>Electric Mortise Lockset</td>
<td>L9092EL-17A x RX</td>
<td>626</td>
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<tr>
<td>Mortise Cylinder</td>
<td>UL437</td>
<td>626</td>
</tr>
</tbody>
</table>

Note: Electric mortise lockset is fail safe; lever on pull side is normally in locked condition; inside lever is always free for egress.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Part Number</th>
<th>BOM Code</th>
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<tbody>
<tr>
<td>Lock Guard, Mortise Lock</td>
<td>5000T</td>
<td>626</td>
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<td>Power Supply</td>
<td>PS902</td>
<td>VON</td>
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<tr>
<td>Closer, w/Spring Stop</td>
<td>4040XP SCUSH</td>
<td>689</td>
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<tr>
<td>Kick Plate</td>
<td>KO050 8 x 2LDW x CS x B4E</td>
<td>630</td>
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<tr>
<td>Door Contact, Pop-in, DPDT</td>
<td>MSS100-4Y</td>
<td>White FLR</td>
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<td>Card Reader (single-gang) and Control Electronics</td>
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</table>

Note 1: Provide 115VAC, 60Hz, 1A service to power supply. Provide conduit with pull strings from electric mortise lockset and door position switch to power supply.

System Function: Free egress by inside lever. Ingress by valid card from pull side of door or by mechanical key override or by power failure.

### Hardware Set E05 – Door 103

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Part Number</th>
<th>BOM Code</th>
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<tr>
<td>Butt Hinges</td>
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<td>652</td>
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<tr>
<td>Jamb-to-Door Power Transfer</td>
<td>EPT-10</td>
<td>VON</td>
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<tr>
<td>Electric Mortise Lockset</td>
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<td>626</td>
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</table>

Note: Electric mortise lockset is fail safe; lever on both sides are normally in locked condition.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Part Number</th>
<th>BOM Code</th>
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<tbody>
<tr>
<td>Mortise Cylinder</td>
<td>UL437</td>
<td>626</td>
</tr>
<tr>
<td>Lock Guard, Mortise Lock</td>
<td>5000T</td>
<td>626</td>
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<tr>
<td>Power Supply</td>
<td>PS902</td>
<td>VON</td>
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<tr>
<td>Closer, HD Parallel Arm</td>
<td>4040XP EDA</td>
<td>689</td>
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<tr>
<td>Kick Plate</td>
<td>KO050 8 x 2LDW x CS x B4E</td>
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<tr>
<td>Wall Stop, Convex</td>
<td>1270CX</td>
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<tr>
<td>Door Contact, Pop-in, DPDT</td>
<td>MSS100-4Y</td>
<td>White FLR</td>
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<tr>
<td>Card + PIN Reader (single-gang) and Control Electronics</td>
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</tbody>
</table>

Note 1: Provide 115VAC, 60Hz, 1A service to power supply. Provide conduit with pull strings from electric mortise lockset and door position switch to power supply.

System Function: Ingress and egress by valid card from either side of door or by mechanical key override or by power failure.

### Hardware Set 01 – Door 109

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Part Number</th>
<th>BOM Code</th>
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</thead>
<tbody>
<tr>
<td>Butt Hinges</td>
<td>BB5000-454</td>
<td>652</td>
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<tr>
<td>Privacy Set w/Indicator</td>
<td>L9040-17A x L283-722</td>
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<td>Closer, HD Parallel Arm</td>
<td>4040XP EDA</td>
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<td>Kick Plate</td>
<td>KO050 8 x 2LDW x CS x B4E</td>
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### Hardware Set 02 – Door 111

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<tr>
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<td>Push Plate</td>
<td>1809-4 x RC</td>
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<tr>
<td>Pull Plate</td>
<td>1014-3B x RC</td>
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<td>Closer, C&amp;R, Pull-side</td>
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<td>Butt Hinges</td>
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<tr>
<td>Classroom Deadbolt</td>
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<td>626</td>
<td>SCH</td>
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<tr>
<td>Flush Pull, Closet</td>
<td>7060</td>
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<td>TRI</td>
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<td>Wall Stop, Convex</td>
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## Hardware Set 04 – Doors 104, 105

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<td>Communicating Lock w/Deadbolt</td>
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<td>Mortise Cylinder</td>
<td>UL437</td>
<td>626</td>
<td>SCH</td>
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<tr>
<td>Lock Guard, Mortise Lock</td>
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<td>Wall Stop, Convex</td>
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<td>Adjustable Jamb Seal Set</td>
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<td>Lock Guard, Mortise Lock</td>
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<td>Overhead Stop, HD, Surface</td>
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## Hardware Set 07 – Door 107

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<td>SCH</td>
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<tr>
<td>Lock Guard, Mortise Lock</td>
<td>5000T</td>
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<td>Closer, w/Stop</td>
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END OF SECTION
SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Glass for door, interior borrowed lites and storefront framing.
   2. Glazing sealants and accessories.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.


D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass 12 inches (300 mm) square.
   1. Tinted glass.
   2. Laminated glass.
   3. Insulating glass.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
1.6 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For Installer.
   B. Product Certificates: For glass.
   C. Product Test Reports: For tinted glass, coated glass and insulating glass for tests performed by a qualified testing agency.
   D. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE
   A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
   B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

1.8 DELIVERY, STORAGE, AND HANDLING
   A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
   B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 FIELD CONDITIONS
   A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
      1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.10 WARRANTY
   A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
      1. Warranty Period: 10 years from date of Substantial Completion.
   B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions.

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instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Ten years from date of Substantial Completion.

C. Manufacturer’s Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer’s written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1. Guardian Industries Corp.
2. Old Castle Building Envelope
3. Pilkington North America
4. PPG Industries
5. Trulite Glass & Aluminum Solutions

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

1. Obtain tinted glass from single source from single manufacturer.
2. Obtain reflective-coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

   a. Wind Design Data: As indicated on Drawings.
   b. Basic Wind Speed: 90 mph (40 m/s).
   c. Importance Factor: 1.0.
   d. Exposure Category: B.
2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.

3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glassing values, according to NFRC 100 and based on LBL’s WINDOW 5.2 computer program, expressed as Btu/sq. ft x h x deg F (W/sq. m x K).
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glassing values, according to NFRC 200 and based on LBL’s WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glassing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.


B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.
2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.


2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
   2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
   1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
   2. Perimeter Spacer: Aluminum with mill or clear anodic finish.

2.7 GLAZING SEALANTS

A. General:
   1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product
manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
   a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch (3-mm) 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.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. 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.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. 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.
H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket 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. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. 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 buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.
D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. Glass Type: Clear fully tempered float glass.
   1. Minimum Thickness: 6 mm.
   2. Safety glazing required where indicated on drawings.

B. Glass Type: Tinted fully tempered float glass.
   1. Tint Color: Gray.
   2. Minimum Thickness: 6 mm.
   3. Safety glazing required where indicated on drawings.

3.9 LAMINATED GLASS SCHEDULE

A. Glass Type: Clear laminated glass with two plies of fully tempered float glass.
   1. Interlayer Thickness: 0.030 inch (0.76 mm).

3.10 INSULATING GLASS SCHEDULE

A. Glass Type: Low-E-coated, clear insulating glass.
   2. Overall Unit Thickness: 1 inch (25 mm).
   3. Minimum Thickness of Each Glass Lite: 6 mm.
   4. Outdoor Lite: Fully tempered float glass.
   5. Interspace Content: Argon.
   6. Indoor Lite: Annealed float glass.
   7. Low-E Coating: Pyrolytic on second surface.
   8. Winter Nighttime U-Factor: .28 maximum.
   12. Safety glazing required.

END OF SECTION 088000
SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Non-load-bearing steel framing systems for interior partitions.
   2. Suspension systems for interior ceilings and soffits.
   3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:
   1. Section 092900 “Gypsum Board”.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.

B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.
1. Steel Studs and Tracks:
   a. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).
   b. Depth: As indicated on Drawings.

2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
   a. Minimum Base-Metal Thickness: 0.0190 inch (0.483 mm).
   b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide the following:
   1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
   2. Depth: 7/8 inch (22.2 mm).

E. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/2 inches, wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:
   1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 as appropriate for the substrate.
      a. Uses: Securing hangers to structure.
      b. Type: Torque-controlled, expansion anchor.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:


PART 3 - EXECUTION

3.1 EXAMINATION

A. 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 of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
3. **Tile Backing Panels:** 16 inches (406 mm) o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. **Slip-Type Head Joints:** Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. **Door Openings:** Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
   a. Install two studs at each jamb unless otherwise indicated.
   b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
   c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. **Other Framed Openings:** Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. **Fire-Resistance-Rated Partitions:** Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

5. **Sound-Rated Partitions:** Install framing to comply with sound-rated assembly indicated.

6. **Curved Partitions:**
   a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
   b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. **Direct Furring:**

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. **Installation Tolerance:** Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 **INSTALLING CEILING SUSPENSION SYSTEMS**

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. **Hangers:** 48 inches (1219 mm) o.c.
B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
   a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
   a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Do not attach hangers to steel roof deck.

5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216
SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Expanded reinforcement.

B. Related Requirements:
   1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers:
   1. American Gypsum
   2. Certainteed Corp.
   3. Georgia Pacific Building Products
   5. USG Company
   6. Continental

B. Gypsum Wallboard: ASTM C 1396/C 1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

E. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
   1. Core: 5/8 inch (15.9 mm).
   2. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
   3. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
   5. Hard-Body Impact: ASTM C 1629 / C1629 M meets or exceeds Level 1 requirements.
7. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

F. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
   1. Core: 5/8 inch (15.9 mm), Type X.
   2. Long Edges: Tapered.
   3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Shapes:
      a. Cornerbead.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound.
      c. L-Bead: L-shaped; exposed long flange receives joint compound.
      d. Expansion (control) joint.
      e. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
   1. Interior Gypsum Board: Paper.
   2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: For second coat, use drying-type, all-purpose compound.
   4. Finish Coat: For third coat, use setting-type, sandable topping compound.
   5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer’s written instructions.

B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

D. Sound Attenuation and Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

E. Expanded Metal Mesh Reinforcement
   1. Gauge: #9 (10 gauge)
   2. Standard Carbon Steel
   3. Style: Flattened
   4. Opening: 1-1/2" (nom.)
   5. Location: Install to metal study framing or ceiling suspension systems prior to installation of gypsum board products where indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and 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. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.
F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

## 3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings.
3. Ceiling Type: As indicated on Drawings.
4. Abuse-Resistant Type: As indicated on Drawings
5. Mold-Resistant Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.

2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 5: At all occupiable locations, U.N.O.

### 3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900
SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS
   A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
      1. Acoustical Ceiling Units: Full-size panels equal to 5 percent of quantity installed.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Deliver acoustical panels, suspension-system components, and accessories to Project site 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.
   B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.7 FIELD CONDITIONS
   A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, 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.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: Class A according to ASTM E 1264.
   2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL PANELS

1. Armstrong World Industries
2. Chicago Metallic Corp.
3. USG Company

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

A. Classification: Provide panels as follows:
   1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
   2. Pattern: CE (perforated, small holes and lightly textured).

D. Color: White.

E. Light Reflectance (LR): Not less than 0.85.

F. Ceiling Attenuation Class (CAC): Not less than 40.

G. Noise Reduction Coefficient (NRC): Not less than 0.70.

H. Edge/Joint Detail: Angled tegular.

I. Thickness: 3/4 inch (19 mm).

J. Modular Size: 24 by 24 inches (610 by 610 mm).

K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.
2.4 METAL SUSPENSION SYSTEM

A. Manufacturers:
   1. Armstrong World Industries
   2. Chicago Metallic Corp.
   3. USG Company

B. Metal Suspension-System Standard: Provide manufacturer’s standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

C. Narrow-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, G30 (Z90) coating designation; with prefinished 9/16-inch- (15-mm-) wide metal caps on flanges.
   2. End Condition of Cross Runners: butt-edge type.
   3. Face Design: Flat, flush.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:
   2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
   4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- (3.5-mm-) diameter wire.

PART 3 - EXECUTION

3.1 EXAMINATION

A. 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.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. 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 unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer’s written instructions.

B. Suspend ceiling hangers from building’s structural members and as follows:

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.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. 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.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure 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.
5. 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.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building’s structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. 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 precise fit.

1. Arrange directionally patterned acoustical panels as follows:
   a. As indicated on reflected ceiling plans.

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. 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.

4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m) non-cumulative.

3.5 CLEANING

A. 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.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113
SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Thermoset-rubber base.
2. Vinyl molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:
1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE

A. Manufacturers:
   1. Armstrong World Industries, Inc
   2. Flexco
   3. Roppe Corporation
   4. Johnsonite

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
   2. Style and Location:
      a. Style B, Cove.

C. Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed.

G. Inside Corners: Job formed.

H. Colors: As selected by Architect from manufacturer's full range.

2.2 RUBBER MOLDING ACCESSORY

A. Description: Rubber reducer strip for resilient floor transition strips.

B. Locations: Provide rubber molding accessories in areas indicated.

A. Colors and Patterns: As selected by Architect from manufacturer's full range.
2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
   1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
      a. Form without producing discoloration (whitening) at bends.
   2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
      a. Miter corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary
      Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.
   B. Samples: Full-size units of each color, texture, and pattern of floor tile required.

1.4 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS
   A. Furnish extra materials that match products installed and that are packaged with protective
      covering for storage and identified with labels describing contents.

1.7 QUALITY ASSURANCE
   A. Installer Qualifications: An entity that employs installers and supervisors who are competent in
      techniques required by manufacturer for floor tile installation and seaming method indicated.

   1. Engage an installer who employs workers for this Project who are trained or certified by
      floor tile manufacturer for installation techniques required.
1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE

A. Manufacturers:
   1. Armstrong World Industries
   2. Congoleum Corporation
   3. Johnsonite
   4. Mannington Mills, Inc.
   5. VPI Corporation

B. Tile Standard: ASTM F 1700.

   1. Class: Class I, Monolithic Vinyl Tile.
   2. Type: A, Smooth Surface.

C. Thickness: 0.125 inch (3.2 mm).
D. Size: 16 by 16 inches.

E. Colors and Patterns: As selected by Architect from manufacturer’s full range of selections.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

      a. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
   1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
   1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:
1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
   1. Apply two coat(s).

E. Joint Sealant: Apply sealant to resilient terrazzo floor tile perimeter and around columns, at door frames, and at other joints and penetrations.

F. Cover floor tile until Substantial Completion.

END OF SECTION 096519
SECTION 096536 - STATIC-CONTROL RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Static-dissipative, solid vinyl floor tile.
   B. Related Requirements:
      1. Section 096513 "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with static-control resilient flooring.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.
   B. Samples for Initial Selection: For each type of static-control resilient flooring.

1.4 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For each type of static-control resilient flooring to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS
   A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
      1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.
1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for static-control resilient flooring.
   1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store static-control resilient flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).
   1. Floor Tile: Store on flat surfaces.

1.9 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive static-control resilient flooring during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during static-control resilient flooring installation.

D. Close spaces to traffic for 48 hours after static-control resilient flooring installation.

E. Install static-control resilient flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Static-Dissipative Properties: Provide static-control resilient flooring with static-control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.
   1. Electrical Resistance: Test per ASTM F 150 with 100-V applied voltage.
      a. Average greater than 1 megohm and less than or equal to 1000 megohms when test specimens are tested surface to ground.
      b. Average greater than 1 megohm and less than or equal to 1000 megohms when installed floor coverings are tested surface to ground.
2. Static Generation: Less than 300 V when tested per AATCC-134 at 20 percent relative humidity with conductive footwear.
3. Static Decay: 5000 to zero V in less than 0.25 seconds when tested per FED-STD-101C/4046.1.

2.2 STATIC-DISSIPATIVE RESILIENT FLOOR COVERINGS

A. Static-Dissipative, Solid Vinyl Floor Tile: ASTM F 1700, Class I (monolithic), Type A (smooth surface).
   1. Manufacturers:
      a. Forbo Industries
      b. Johnsonite
      c. VPI Corporation
   2. Thickness: In manufacturer’s standard thickness, but not less than 0.08 inch (2.0 mm).
   3. Size: 24 by 24 inches (610 by 610 mm).
   5. Colors and Patterns: As selected by Architect from full range of industry color.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified portland cement or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
B. Static-Control Adhesive: Provided or approved by manufacturer; type that maintains electrical continuity of floor-covering system to ground connection.
C. Grounding Strips: Provided or approved by manufacturer; type and size that maintains electrical continuity of floor-covering system to ground connection.
D. Floor Polish: Provide protective, static-control liquid floor polish products as recommended by floor-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static-control characteristics of floor coverings.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of static-control resilient flooring and electrical continuity of floor-covering systems.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with floor-covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
   a. Perform relative-humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative-humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install static-control resilient flooring until it is same temperature as space where it is to be installed.

1. Move static-control resilient flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum substrates to be covered by static-control resilient flooring immediately before installation.

3.3 INSTALLATION, GENERAL

A. Install static-control resilient flooring according to manufacturer's written instructions.

B. Embed grounding strips in static-control adhesive. Extend grounding strips beyond perimeter of static-control resilient floor-covering surfaces to ground connections.

C. Scribe, cut, and fit static-control resilient flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

D. Extend static-control resilient flooring into toe spaces, door reveals, closets, and similar openings. Extend static-control resilient flooring to center of door openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on static-control resilient flooring as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Install static-control resilient flooring on covers for telephone and electrical ducts, and similar items in installation areas. Maintain overall continuity of color and pattern with pieces of static-control resilient flooring installed on covers. Tightly adhere static-control resilient flooring edges to substrates that abut covers and to cover perimeters.
G. Adhere static-control resilient flooring to substrates using a full spread of static-control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 FLOOR-TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.

1. Lay floor tiles square with room axis.

C. Match floor tiles for color and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.

1. Lay static-dissipative, vinyl composition floor tiles with grain direction alternating in adjacent floor tiles (basket-weave pattern).

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of static-control resilient flooring.

B. Perform the following operations immediately after completing static-control resilient flooring:

1. Remove static-control adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect static-control resilient flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

1. Do not wax static-control resilient flooring.
2. If recommended in writing by manufacturer, apply protective static-control floor polish formulated to maintain or enhance floor covering's electrical properties; ensure static-control resilient flooring surfaces are free from soil, static-control adhesive, and surface blemishes.
   a. Verify that both floor polish and its application method are approved by manufacturer and that floor polish will not leave an insulating film that reduces static-control resilient flooring's effectiveness for static control.

D. Cover static-control resilient flooring until Substantial Completion.

END OF SECTION 096536
SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. High-performance resinous flooring systems.

B. Related Sections:
   1. Section 079200 "Joint Sealants" for sealants installed at joints in resinous flooring systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Initial Selection: For each type of exposed finish required.

C. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

   1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Basis of Design: Dex-O-Tex Colorflake L as manufactured by Crossfield Products Corp.
2. Duraflex
3. BASF
4. Degussa Building Systems
5. Action Flooring: Herculan 1G Epoxy Flooring System
6. Or Approved Equal

2.2 HIGH-PERFORMANCE RESINOUS FLOORING

A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance-aggregate-filled, resin-based, monolithic floor surfacing designed to produce a seamless floor and cove base where indicated on drawings.

B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range.
2. Wearing Surface: Textured for slip resistance.
3. Overall System Thickness: 3/16 inch (4.8 mm).

C. Primer Coat:

1. Resin: Epoxy Urethane
2. Application Method: Per manufacturer requirements.
   a. Number of Coats: 1 for non-porous concrete; a second coat is required if the first coat is absorbed by the concrete.

D. Body Coats:

1. Resin: Epoxy Urethane
   a. Number of Coats: Two.
3. Aggregates: Manufacturer's standard.

E. Topcoat: Sealing or finish coats.
   1. Resin: Aliphatic Polyester Urethane
   2. Type: Clear.
   3. Finish: Matte.
   4. Number of Coats: Two.

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
   1. Compressive Strength: 9,000 psi per ASTM D 695.
   2. Tensile Strength: 1,200 psi per ASTM D 638.
   3. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch (1.6-mm) permanent indentation per MIL-D-3134.
   4. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) per MIL-D-3134.
   5. Flammability: Self-extinguishing per ASTM D 635.
   6. VOC < 100 g/L

2.3 ACCESSORIES
A. Primer: Type recommended by manufacturer for substrate and body coats indicated.
B. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION
A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
   1. Roughen concrete substrates as follows:
      a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
   2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
   3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab area in 24 hours.
b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
c. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.2 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: 6 inches high.

D. Apply self-leveling slurry body coats in thickness indicated for flooring system.

E. Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.

F. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.
3.3 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723
SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes modular carpet tile.

B. Related Requirements:
   1. Section 024119 "Selective Demolition" for removing existing floor coverings.
   2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
   2. Include manufacturer's written installation recommendations for each type of substrate.

B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
   1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
   2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

1.7 FIELD CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.8 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.

2. Failures include, but are not limited to, the following:

   a. More than 10 percent edge raveling, snags, and runs.
   b. Dimensional instability.
   c. Excess static discharge.
   d. Loss of tuft-bind strength.
   e. Loss of face fiber.
   f. Delamination.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Manufacturers:
1. Mohawk (Basis-of-Design: CEO II Tile Pure Genius II)
2. Shaw Contract
3. Tandus
4. Patcraft

B. Color: As selected by Architect from manufacturer's full range.

C. Fiber Content: 100 percent nylon 6, 6 or 100 percent nylon 6.

D. Fiber Type: Color Strand Nylon

E. Pile Characteristic: Textured multi colored tufted loop pile.

F. Pile Thickness: .126 inches for finished carpet tile.

G. Stitches: 106 per inch.

H. Gage: 1/10 per inch.

I. Surface Pile Weight: 15.0.

J. Backing System: Mohawk Basis-of-Design: Ecoflex ICT

K. Size: 24 by 24 inches (610 by 610 mm).

L. Applied Treatments:
   2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
      a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer, glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.

E. Cut and fit carpet tile 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 tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.

B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813
SECTION 099123 - INTERIOR PAINTING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

1.  Concrete.
2.  Concrete masonry units (CMUs).

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1.  Provide paint assembly schedule.
2.  Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.
1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. 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 (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1. Ferrell-Calhoun
2. PPG Architectural Finishes, Inc.
3. Sherwin Williams Company

B. Products: Subject to compliance with requirements, provide one of the products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Masonry (Clay and CMUs): 12 percent.
   3. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and 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.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
   1. SSPC-SP 2.
G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer’s written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
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. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. 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.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. 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.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:
   a. Equipment, including panelboards.
   b. Uninsulated metal piping.
   c. Uninsulated plastic piping.
   d. Pipe hangers and supports.
   e. Metal conduit.
   f. Plastic conduit.
   g. Tanks that do not have factory-applied final finishes.
   h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:
   a. Equipment, including panelboards.
   b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. 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.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Traffic Surfaces:

1. Epoxy System MPI INT 3.2C:
   c. Topcoat: Epoxy, gloss, MPI #77.

1) Sherwin Williams: Tile-Clad HS Epoxy, or equal.

B. CMU Substrates:

1. High-Performance Architectural Latex System MPI INT 4.2D:
   1) Sherwin Williams; Loxon Block Surfacer
c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
   1) Sherwin Williams; Pro Industrial Catalyzed Waterbased Epoxy Eg-Shell
d. Topcoat: Latex, interior, high performance architectural (MPI Gloss

C. Steel Substrates:
   1. High-Performance Architectural Latex System MPI INT 5.1R.
      a. Prime Coat: Primer, alkyd, quick dry, for metal, MPI #76.
         1) Sherwin Williams; Kem Bond HS Universal Metal Primer.
      b. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
         1) Sherwin Williams; Pro Industrial Pre Catalyzed Waterbased Epoxy Eg-Shell.
      c. Topcoat: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5), MPI #141.
         1) Sherwin Williams; Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.

D. Gypsum Board Substrates:
   1. High-Performance Architectural Latex System MPI INT 9.2B:
      a. Prime Coat: Primer sealer, latex, interior, MPI #50.
         1) Sherwin Williams; Promar 200 Zero VOC Interior Latex Primer.
      c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
         1) Sherwin Williams; Pro Industrial Pre-Catalyzed Waterbased Epoxy Eg-Shell.
      d. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 5), MPI #141.
         1) Sherwin Williams; Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
END OF SECTION 099123
SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
   1. Panel signs.

1.3 DEFINITIONS
A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION
A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.
B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: For panel signs.
   1. Include fabrication and installation details and attachments to other work.
   2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
   3. Show message list, typestyles, graphic elements including raised characters and Braille, and layout for each sign at least half size.
C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
   1. Include representative Samples of available typestyles and graphic symbols.
D. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.
1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Deterioration of finishes beyond normal weathering.
   b. Deterioration of embedded graphic image.
   c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2013 ADA Standards for Accessible Design".

2.2 PANEL SIGNS

A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers:
   a. Best Sign Systems
   b. ASI Sign Systems
   c. Johnson Signs, Inc.
   d. American Graphics, Inc.

2. Solid-Sheet Sign Returns, and Back: Sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph and as follows:
   a. Thickness: 0.125 inch (3.18 mm), 0.24 inch (6.35 mm).
   c. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
   d. Inset, Cutout Characters: Sign face routed to receive push-through acrylic graphics slightly projecting from the sign panel.
2.3 PANEL-SIGN MATERIALS

A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer’s standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2. Sign Mounting Fasteners:
   
a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.

3. Inserts: Furnish inserts to be set by other installers into concrete or masonry work.

B. Two-Face Tape: Manufacturer’s standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.5 FABRICATION

A. General: Provide manufacturer’s standard sign assemblies according to requirements indicated.

1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.

2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.

4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

5. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.

6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
C. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer’s standard enamel. Apply opaque manufacturer’s standard background color coating over enamel-filled copy.

D. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

E. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
   1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner’s use.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer’s written instructions.

   1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Accessible Signage: Install in locations on walls as indicated on Drawings and according to the accessibility standard.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
   a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
   b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

D. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423
SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Corner guards.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

1. Include Samples of accent strips and accessories to verify color selection.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.

2. Keep plastic materials out of direct sunlight.

3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).

a. Store corner-guard covers in a vertical position.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.

b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall- and door-protection products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

2.3 CORNER GUARDS

A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard, assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Manufacturers:
   a. Balco, Inc., Type CGS-3
   b. Pawling Corp
   c. Construction Specialties

2. Cover: Extruded rigid plastic, minimum 0.078-inch (2.0-mm) wall thickness; as follows:
   a. Profile: Nominal 2-inch- (50-mm-) long leg and 1/4-inch (6-mm) corner radius corner radius.
   b. Height: 8 feet (2.4 m) terminate at top of resilient base.
   c. Color and Texture: As selected by Architect from manufacturer's full range.

3. Continuous Retainer: Minimum 0.060-inch- (1.5-mm-) thick, one-piece, extruded aluminum.
4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.4 MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
2.5 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of the Work.

B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
B. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.

1. Provide anchoring devices and suitable locations to withstand imposed loads.
2. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm) apart.
3. Adjust top caps as required to ensure tight seams.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600
SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Public-use washroom accessories.

1.3 COORDINATION
   A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
   B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS
   A. Product Data: For each type of product.
      1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
      2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
      3. Include electrical characteristics.

1.5 INFORMATIONAL SUBMITTALS
   A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY
   A. Manufacturer’s Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
Failures include, but are not limited to, visible silver spoilage defects.

Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Manufacturers:

1. AJW Architectural Products
2. American Specialties, Inc.
3. Bobrick Washroom Equipment
4. Bradley Corp.
5. Gamco
6. Georgia Pacific

C. Basis-of-Design: Refer to Toilet Accessory Schedule in drawings.

2.3 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.


E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

F. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

G. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers’ written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800
SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
   1. Fire-protection cabinets for the following:
      a. Portable fire extinguishers.
B. Related Requirements:
   1. Section 104416 "Fire Extinguishers."

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
   1. Show location of knockouts for hose valves.
B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.4 COORDINATION
A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
B. Coordinate sizes and locations of fire-protection cabinets with wall depths.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. 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.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Cold-rolled steel sheet

D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

   1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Steel sheet.

G. Door Style: Fully glazed panel with frame.

H. Door Glazing: Tempered break glass (clear).

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

   1. Provide projecting door pull and friction latch.
   2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

J. Accessories:

   1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
   2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
   3. Door Lock: Cylinder lock, keyed alike to other cabinets.
   4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
a. Identify fire extinguisher in fire-protection cabinet with the words “FIRE EXTINGUISHER.”

1) Location: Applied to cabinet door.
3) Lettering Color: Red.
4) Orientation: Vertical.

K. Materials:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
   a. Finish: Baked enamel or powder coat.
   b. Color: As selected by Architect from full range of industry colors and color densities.
2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS


B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.
D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. Fire-Protection Cabinets: 54 inches (1372 mm) above finished floor to top of cabinet.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.

2. Provide inside latch and lock for break-glass panels.

3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413
SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

B. Multipurpose Dry-Chemical Type in Steel Container UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.


PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416
SECTION 105613 - METAL STORAGE SHELVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Four-post metal storage shelving.

1.3 COORDINATION
   A. Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.
   B. Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

1.4 ACTION SUBMITTALS
   A. Product Data: For each type of product.
      1. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal storage shelving.

1.5 FIELD CONDITIONS
   A. Environmental Limitations: Do not deliver or install metal storage shelving until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 FOUR-POST METAL STORAGE SHELVING
   A. Open Four-Post Metal Storage Shelving: Complying with MH 28.1 and field assembled from factory-formed components. Shelves span between supporting corner posts that allow shelf-height adjustment over full height of shelving unit. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.
1. Load-Carrying Capacity per Shelf: 350 lb (159 kg)
2. Posts: Fabricated from hot-rolled steel; in manufacturer’s standard shape; with perforations at 1-1/2 inches (38 mm) o.c. to receive shelf-to-post connectors.
   a. Unit Configuration: Configure shelving units as individual, freestanding assemblies.
   b. Post Base: Adjustable steel floor plate, drilled for floor anchors.
   a. Location: At unit back as required for stability, load-carrying capacity of shelves, and number of shelves indicated.
4. Truss-Type Wire Shelves: Steel wire-over-wire construction, with downturned wire truss edges.
5. Shelf Quantity: Three shelves per shelving unit in addition to top and bottom shelf.
6. Shelf-to-Post Connectors: Manufacturer’s standard connectors
7. Base: Open, with exposed post legs
8. Overall Unit Width: 48 inches (1219 mm) inclusive of two end posts.
9. Overall Unit Depth: 18 inches (457 mm)
10. Overall Unit Height: 72 inches (1829 mm)
11. Steel Finish: Baked enamel or powder coat.
   a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.2 ANCHORS

A. Floor Anchors: Galvanized-steel, post-installed expansion anchors, power-actuated fasteners or threaded concrete screws. Provide number per unit recommended by manufacturer unless additional anchors are indicated in calculations.

2.3 FABRICATION

A. Fabricate metal storage shelving components to provide field-assembled units that are square and rigid, with posts plumb and true and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.
   1. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
   2. Build in straps, plates, brackets, and other reinforcements as needed to support shelf loading.
   3. Cut, reinforce, drill, and tap metal fabrications to receive hardware, fasteners, and similar items.

B. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

C. Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a hem on the concealed side; ease edges of metal plate to radius of approximately 1/32 inch (0.8 mm). Shear and punch metals cleanly and accurately. Remove burrs.
D. Weld corners and seams continuously to develop strength, minimize distortion, and maintain the corrosion resistance of base metals. At exposed locations, finish welds and surfaces smooth and blended so surface is smooth after finishing and contour of welded surface matches that of adjacent surface. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces before finishing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine floors for suitable conditions where metal storage shelving will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Vacuum and clean finished floor over which metal storage shelving is to be installed.

3.3 INSTALLATION

A. Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.

1. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
2. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.
3. Anchor shelving units to floor with floor anchors through floor plate. Shim floor plate to achieve level and plumb installation.
4. Install shelves in each shelving unit at equal spacing.

3.4 ADJUSTING

A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.

B. Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.

C. Replace metal storage shelving components that have been damaged beyond successful repair by finish touchup or similar minor repair procedures.
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes
   1. Vinyl-coated ventilated shelving.

B. Submittals
   1. Product Data: Manufacturer’s catalog data, detail sheets, and specifications.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: ClosetMaid® Corp.
B. Rubbermaid
C. EZ Shelf

2.2 MATERIALS

A. Steel Wire: Basic cold drawn, Grade C-1006; average tensile strength over 100,000 psi (690 MPa); coated.

B. Wire Coating: Proprietary heavy-duty polyvinyl chloride (PVC) formula resin, plasticizers, stabilizers, pigments, and other additives.
   1. Thickness: 7 to 17 mils (0.178 to 0.432 mm).

2.3 MANUFACTURED UNITS

A. Wire Shelving): Coated steel wire, 5/8 to 1 inch (15 to 25 mm) incremental crossdesk spacing.
   1. TotalSlide – 5/8” spacing in White Wire (12 or 16” depths).

2.4 ACCESSORIES

WARDROBE AND CLOSET SPECIALTIES
BLUEGRASS AIRPORT CUSTOMS FACILITY RENOVATION
SCB 1508
A. Wall Clips.
B. End Brackets.
C. Support Brackets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Prepared spaces are sized and located in accordance with shop drawings.
   2. Framing, reinforcement, and anchoring devices are correct type and are located in accordance with shop drawings.

B. Installer’s Examination:
   1. Examine conditions under which installation is to be performed; submit written notification if such conditions are unacceptable.
   2. Installation activities before unacceptable conditions have been corrected are prohibited.
   3. Installation indicates installer’s acceptance of conditions.

3.2 INSTALLATION

A. Cut shelves 1/2 inch to 1-3/8 inches (12.7 to 35 mm) shorter than actual wall measurements; cap all exposed ends.

B. Install shelving plumb and level at heights indicated in accordance with shop drawings and manufacturer’s printed installation instructions.

C. Place wall clips every 10 to 12 inches (250 to 300 mm) on level line.

D. Install end brackets on same level line as wall clips, centered on the front rods of shelves. Support shelves 36 inches (915 mm) maximum with end brackets, support brackets, or poles.

E. Drill holes where required using sharp bit; do not punch.

J. Shelf Supports:
   1. Place shelf support brackets vertically to the shelf, attach with wall anchors.
   2. Install down clips or cable clips with 1/4 inch (6 mm) anchor on the back rod behind every support bracket.
   3. 36 inches (900 mm) o.c. maximum.

3.3 CLEANING
A. As work proceeds, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris related to this work.

B. Upon completion of installation, clean all surfaces that have become soiled during installation.

END OF SECTION 105700
SECTION 123216 - MANUFACTURED PLASTIC-LAMINATE-FACED CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes plastic-laminate-faced cabinets of stock design.
B. Countertops Capping Fixed Modular Casework and bracket support.
C. Related Requirements:
   1. Section 061000 "Miscellaneous Rough Carpentry" for wood blocking for anchoring casework.
   2. Section 123623 "Plastic-Laminate-Clad Countertops."

1.3 DEFINITIONS
A. Definitions in the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" apply to the work of this Section.
B. MDF: Medium-density fiberboard.
C. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.

1.4 COORDINATION
A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

1.5 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication details, including types and locations of hardware. Show installation details, including field joints and filler panels. Indicate manufacturer's catalog numbers for casework.
C. Samples: For cabinet finishes.
D. Samples for Initial Selection: For cabinet finishes.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project and who is a certified participant in AWI’s Quality Certification Program.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in “Project Conditions” Article.

B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install casework 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. Maintain temperature and relative humidity during the remainder of the construction period in range recommended for Project location by the AWI’s, AWMAC’s, and WI’s “Architectural Woodwork Standards.”

B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of components or other failures of glue bond.
b. Warping of components.
c. Failure of operating hardware.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. LSI Corporation of America.
2. Stevens Industries, Inc.
3. TMI Systems Design Corporation.
4. Euronique, Inc.

B. Source Limitations: Obtain plastic-laminate-faced cabinets from single manufacturer.

2.2 CASEWORK, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.

1. Grade: Premium.
2. Provide labels and certificates from AWI certification program indicating that casework, including installation, complies with requirements of grades specified.

B. Product Designations: Drawings indicate sizes, configurations, and finish materials of manufactured plastic-laminate-faced cabinets by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Division 1.

C. Product Designations: Drawings indicate configurations of manufactured plastic-laminate-faced cabinets by referencing designations of Casework Design Series numbering system in Appendix A of the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

2.3 CASEWORK

A. Design:

1. Flush overlay.

B. Grain Direction for Wood Grain Plastic Laminate:

1. Vertical on both doors and drawer fronts, with continuous vertical matching.
2. Vertical on doors, horizontal on drawer fronts.
3. Lengthwise on face frame members.
4. Vertical on end panels.
5. Side to side on bottoms and tops of units.
6. Vertical on knee-space panels.
7. Horizontal on aprons.

C. Exposed Materials:
   1. Plastic Laminate: Grade HGS.
      a. Colors and Patterns: As selected by Architect from manufacturer's full range.
   2. Unless otherwise indicated, provide specified edgebanding on all exposed edges.

D. Semiexposed Materials:
   1. Plastic Laminate: Grade CLS unless otherwise indicated. Provide plastic laminate for semiexposed surfaces unless otherwise indicated.
      a. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.

E. Concealed Materials:
   1. Particleboard.

2.4 MATERIALS
A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.
D. Particleboard: ANSI A208.1, Grade M-2.
E. MDF: ANSI A208.2, Grade 130.
F. Hardboard: ANSI A135.4, Class 1 Tempered.
G. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Formica Corporation.
      c. Wilsonart LLC.
H. Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, 1 mm thick elsewhere.

2.5 COLORS AND FINISHES
A. Wood Colors and Finishes: As selected by Architect from casework manufacturer's full range.
B. Plastic-Laminate Colors, Patterns, and Finishes: As selected by Architect from plastic-laminate manufacturer's full range.

C. PVC Edgebanding Color: As selected from casework manufacturer's full range.

2.6 CASEWORK HARDWARE AND ACCESSORIES

A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard powder-coated, commercial-quality, heavy-duty hardware.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
2. Magnetic door catch with maximum 5-pound pull provided, attached with screws and slotted for adjustment.

B. Butt Hinges: Powder-coated, semiconcealed, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48 inches (1220 mm) high, and provide three hinges for doors more than 48 inches (1220 mm) high.

1. Provide manufacturer's standard reveal overlay designed to coordinate with 5-knuckle hinges.

C. Pulls: Door and drawer front pulls shall be epoxy powder coated metal wire, 96mm spacing on screws. Pull design shall comply with the Americans with Disability Act (ADA).

D. Drawer Slides: BHMA A156.9, Type B05091.

1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides.
2. File Drawer Slides: Grade 1HD-100, for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
3. Pencil Drawer Slides: Grade 1, for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.
4. Keyboard Slides: Grade 1HD-100, for computer keyboard shelves.

E. Drawer and Hinged Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.

1. Provide individual rooms with master key; furnish 2 master keys per room with keying the same for all room locks.
2. Provide locks on all doors and drawers.

2.7 FABRICATION

A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.

B. All casework panel components shall go through a supplemental sizing process after cutting, producing a panel precisely finished in size and squareness to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.

C. Cabinet Body Construction:
1. Tops and bottoms shall be glued and doweled to cabinet sides and internal cabinet components such as fixed horizontal, rails and verticals. Minimum 6 dowels each joint for 24 inch deep cabinets and a minimum of 4 dowels each joint for 12 inch deep cabinets.
   a. Tops, bottoms and sides of all cabinets shall be particleboard core.

2. Cabinet backs: Backs shall be 1/4 inch thick medium density fiberboard panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior. 3/4 inch x 4 inch particleboard rails will be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels. A third intermediate rail will be included on all cabinets taller than 56 inches. Utilize hot melt glue to further secure back and increase overall strength.
   a. Exposed backs on Teacher's Desks: 3/4 inch thick particleboard with the exterior surface finished in VGS laminate as selected.

3. Fixed base and tall units shall have an individual factory-applied base, constructed of 3/4 inch thick particleboard. Base is 96mm (nominal 4 inch) high unless otherwise indicated on the drawings.

4. Base units: Full sub-top.

5. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.

   a. Edging: 1mm PVC.

7. Adjustable shelf core: Core shall be 3/4 inch thick particleboard up to 36 inches wide, 1 inch thick particleboard over 36 inches wide.
   a. Front edge: 1mm PVC.

8. Interior finish, units with open Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with VGS high-pressure decorative laminate.

9. Interior finish, units with closed Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate.

10. Exposed ends:
   a. Faced with VGS high-pressure decorative laminate.

11. Wall unit bottom:
    a. Faced with VGS high-pressure decorative laminate.

12. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.

D. Drawers:
1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 1mm PVC.

2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.

3. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2 inch thick particleboard drawer
bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.

E. Door/Drawer Fronts:
1. Core: 3/4 inch thick particleboard.
2. Provide double doors in opening in excess of 24 inches wide.
3. Faces:
   a. Exterior: VGS High-pressure decorative laminate.
   b. Interior: High-pressure cabinet liner CLS.
4. Door/drawer edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch (3mm) radius.

F. Miscellaneous Shelving:
1. Core material: 3/4 inch or 1 inch thick particleboard.
2. Exterior: VGS High-pressure decorative laminate.
3. Edges: 3mm PVC, external edges and outside corners machine profiled and machine applied to 1/8 inch (3mm) radius.

G. Adjustable Shelf Supports: Two-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

H. File Suspension System: Extruded molding integral with top of drawer box sides to accept standard hanging file folders.

I. Lockable Caster Wheels: Heavy duty swivel casters (300-900lbs), with 5.5mm top plate and brake option, provide four (4) per mobile unit.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION
A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Install casework level, plumb, and true; shim as required, using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch (1.5 mm) of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm). Bolt adjacent cabinets together with joints flush, tight, and uniform.

D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch (1.5 mm) of a single plane. Fasten to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16 inch (1.5 mm).

E. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

G. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123216
SECTION 123623 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes plastic-laminate countertops.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product high-pressure decorative laminate.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Show locations and sizes of cutouts and holes for plumbing fixtures installed in plastic-laminate countertops.
   2. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples for Initial Selection:
   1. Plastic laminates.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Warranty: Submit manufacturer sample warranty.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

A. Provide five year manufacturer warranty to the Owner against defective material and workmanship. This is a warranty of replacement and repair for defects in material and/or workmanship without charge.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.

1. Provide labels from AWI certification program indicating that countertops comply with requirements of grades specified.
2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

B. Grade: Premium.

C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Formica Corporation.
   b. Lamin-Art, Inc.
   c. Wilsonart LLC.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from manufacturer's full range in the following categories:
   a. Solid colors, gloss finish.
   b. Wood grains, gloss finish.
   c. Patterns, gloss finish.
2. Grain Direction: Parallel to cabinet fronts.

E. Edge Treatment: Exposed edges of countertops and applied backsplash: 3mm PVC. Machine profiled to 1/8 inch.

F. Core Material at Sinks: 1 inch thick moisture resistant (MR) particle board.

G. Core Thickness: 1 inch.
   1. Build up countertop thickness to 1-1/2 inches (38 mm) at front, back, and ends with additional layers of core material laminated to top.

H. Surface: HSG/HSP High Pressure Decorative Laminate with balanced backer sheeting.

I. All countertop joints shall be dry fit at the factory to check for consistency in color from one panel to the other and overall finished panel thickness.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
   1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
   1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
   2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.

2.3 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-inch (51-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
   1. Basis of Design Product: Subject to compliance with requirements, provide “OG series” by Doug Mockett & Company, Inc. or equal.

2.4 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Plastic Laminate: PVA.
   1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

B. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Structural Wood Member Adhesive: 140 g/L.
4. Architectural Sealants: 250 g/L.

2.5 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.

B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined
in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Secure backsplashes to walls with adhesive.
3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 123623
SECTION 125500 - DETENTION FURNITURE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Baggage examination tables (PET)
2. Interview tables (IRT)
3. Interview chairs (IRC)
4. Search room tables (SRT)
5. Wall mounted benches (SHB)
6. Grab bars (HRB1)
7. Pistol Locker (PL)

1.3 COORDINATION

A. Coordinate installation of anchorages for detention furniture. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention furniture.

B. Shop Drawings: For detention furniture.

1. Include plans, elevations, sections, and attachment details.
2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
3. Indicate locations and installation details of built-in anchors.
4. Show elevations of detention furniture and indicate dimensions of furniture, preparations for receiving anchors, and locations of anchorage.
5. Show details of attachment of detention furniture to built-in anchors.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.
B. Examination reports, documenting inspections of substrates, areas, and conditions.

C. Anchor inspection reports, documenting inspections of built-in and cast-in anchors.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

PART 2 - PRODUCTS

2.1 DETENTION TABLES

A. Types:

1. Baggage Examination Tables (PET)
2. Interview Tables (IRT)
3. Search Room Tables (SRT)

B. Table:

1. Size/Construction: As indicated in cut sheets at end of specification.
2. Tabletop: Formed from 0.134-inch (3.42-mm) nominal-thickness stainless steel sheet; reinforced with steel shapes, with minimum 2 inch flanged edges.
3. Table skirt formed from 0.0757 (1.908-mm) nominal thickness stainless steel sheet where indicated with 1-3/4 inch flanged edges.
4. Supports: Formed from 2 inch-square by 1/4 inch thick, steel tubing welded to top and base plate.
5. Base Plate: Minimum 1/4-inch- (6-mm-) thick, steel plate punched with four holes for floor anchorage. Coordinate size for installation against adjacent walls.
   a. For tables indicated to be anchored to the floor.

C. Materials:

1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
2. Steel Tubing: ASTM A 513/A 513M, Type B unless otherwise indicated; thickness indicated or required by structural loads.

D. Finishes:

1. Stainless-Steel Finish:
   a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
   b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.

   1) Run grain of directional finishes with long dimension of each piece.
2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3) Directional Satin Finish: No 4.

2.2 DETENTION SEATING

A. Interview Chairs (IRC):
   1. Size/Construction: As indicated in cut sheets at end of specification.
   2. Seats: Minimum 0.075-inch (1.90-mm) nominal-thickness stainless steel sheet; reinforced with 0.134-inch- (3.42-mm-) thick steel sheet cut to interior dimension of seat, with minimum 1-1/2-inch (38-mm) flanged edges.
   3. Seat Support: Formed from or 3-inch-by-3 inch by 3/16-inch thick, steel tubing welded to seat reinforcement and base plate for an overall stool height of not less than 18 inches (457 mm).

B. Floor-Mounted Bench (SHB):
   1. Size/Construction: As indicated in cut sheets at end of specification.
   2. Seat: Minimum 12-inch (305-mm) deep, formed from 0.134-inch (3.42-mm) nominal-thickness stainless steel sheet; reinforced with 0.134-inch- (3.42-mm-) thick steel sheet cut to interior dimension of seat, with minimum 1-1/2-inch (38-mm) flanged edges.
   3. Provide 2” handcuff ring at each end at back of seat.
   4. Seat Support: Formed from steel pipe or 2-inch-OD-by-0.075-inch- (51-mm-OD-by-1.90-mm-) thick, steel tubing welded to seat reinforcement and base plate for an overall stool height of not less than 18 inches (457 mm).
   5. Size: 7'-0" long by 1'-0" deep by 1'-6" high.

C. Materials:
   1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
   2. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.

D. Finishes:
   1. Stainless-Steel Finish:
      a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
      b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.

         1) Run grain of directional finishes with long dimension of each piece.
         2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
         3) Directional Satin Finish: No 4.
2.3 DETENTION GRAB BARS

A. Grab Bars (HRB1): 1-1/2 inches (38.1 mm) in diameter; formed from 0.038-inch- (0.95-mm-) thick, stainless-steel tubing, with 3-inch- (76.2-mm-) diameter flanges formed from 0.125-inch- (3.18-mm-) thick, stainless steel. Closer plates formed from 0.125-inch- (3.18-mm-) thick, stainless steel. All welded construction.

1. Length: As indicated on Drawings.

B. Materials:

1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 340/A 240M, austenitic stainless steel, Type 304.
2. Stainless-Steel Tubing: ASTM A 1016/A 1016M, austenitic stainless steel, Type 304, seamliness.

C. Stainless-Steel Finish:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   a. Run grain of directional finishes with long dimension or each piece.
   b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
   c. Directional Satin Finish: No. 4.

2.4 PISTOL LOCKERS (PL)

1. Size/Construction: As indicated in cut sheets at end of specification.
2. Body: Formed from 0.134-inch (3.42-mm) nominal-thickness steel sheet; reinforced with steel shapes, with minimum 2 1/2 inch flanged edges.
4. Keying: Each compartment keyed separately (2 copies for each) and master keyed (2 copies)
5. Finish: Powder Coat Finish – as selected by Architect from Manufacturer’s full range (minimum 12)

D. Materials:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
2. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
2.4 FABRICATION

A. 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.

B. Coordinate dimensions and attachment methods of detention furniture with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Form and grind edges and corners to be free of sharp edges or rough areas.

   1. Fabricate detention furniture with no more than 1/32-inch (0.8-mm) gap between component materials. Weld edges that cannot be crimped to meet tolerance so as to provide a seamless joint with no place for concealment of contraband.

E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

F. Weld corners and seams continuously to comply with referenced AWS standard and the following:

   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
   5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention furniture rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

H. Cut, reinforce, drill, and tap detention furniture as indicated to receive hardware, security fasteners, and similar items.

I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.

J. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security fasteners. Locate joints where least conspicuous.
2.5 SECURITY FASTENERS

A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific type of fastener. Drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:

1. Drive-System Type: Pinned Torx.
2. Fastener Strength: 120,000 psi (827 MPa).
3. Socket Button Head Fasteners:
   b. Stainless steel, ASTM F 879 (ASTM F 879M), Group 1 CW.
4. Socket Flat Countersunk Head Fasteners:
   b. Stainless steel, ASTM F 879 (ASTM F 879M), Group 1 CW.
5. Socket Head Cap Fasteners:
   b. Stainless steel, ASTM F 837 (ASTM F 837M), Group 1 CW.

2.6 ACCESSORIES

A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention furniture.

B. Verify locations of detention furniture with those indicated on Shop Drawings.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention furniture to in-place construction. Include threaded fasteners for concrete and masonry, security fasteners, and other connectors.

B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention furniture. Set detention furniture accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. 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.
D. Assemble detention furniture requiring field assembly with security fasteners with no exposed fasteners on exposed faces and frames.

E. Anchor furniture with security fasteners to floors and walls at intervals required by expected loads, but not more than 12 inches (305 mm) o.c.
   1. Install anchors through backup reinforcing plates where necessary to avoid metal distortion.
   2. Use security fasteners with head styles appropriate for installation requirements, strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project.

F. Apply polyurethane security sealant at all exposed gaps between detention furniture and adjacent construction greater than 1/16 inch (1.6 mm).

G. Install one detention mattress for each detention bunk.

3.3 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.

C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

3.4 CLEANING AND PROTECTION

A. Touchup Painting: Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 125500
EXAMINATION TABLE

NOTES:
1. SMOOTH ALL SHARP EDGES.
2. ALL SURFACES TO BE PLAT & TRUE.
3. ALL TYPE 304 STAINLESS STEEL CONSTRUCTION.
4. TABLE TOP TO BE POLISHED.
INTERVIEW TABLE

NOTES:
1. SMOOTH ALL SHARP EDGES.
2. ALL SURFACES TO BE FLAT & TRUE.
3. ALL TYPE 304 STAINLESS STEEL CONSTRUCTION.
4. TABLE TOP TO BE #4 FINISH.
5. ANCHOR TO FLOOR WITH TAMPER-PROOF FASTENERS
NOTES:
1. SMOOTH ALL SHARP EDGES
2. USE TAMPER-PROOF FASTENERS

Handcuff Rings welded to front of each Pedestal

BASIS OF DESIGN

Approval
Date

PROPRIETARY
THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS NOT TO BE REPRODUCED, USED OR OTHERWISE DISCLOSED IN WHOLE OR IN PART TO ANYONE WITHOUT THE WRITTEN AUTHORIZATION FROM GD AUTOMATED TECHNOLOGIES, LLC.
STAINLESS STEEL GRAB BAR

NOTES:
1. SMOOTH ALL SHARP EDGES.
2. ALL TYPE 304 STAINLESS STEEL CONSTRUCTION w/64 FINISH.
3. USE TAMPER-PROOF FASTNERS
1. GENERAL

   A. The Advertisement for Bids, Instructions to Bidders, Bidding Requirements, General, Special and Supplementary Conditions, and all other contract documents shall apply to the Contractor's work as well as to each of his Sub-Contractor's work. All manufacturers, suppliers, fabricators, contractors, etc. submitting proposals to any part if for work, services, materials or equipment to be used on or applied to this project are hereby directed to familiarize themselves with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.

   B. Each Proposer shall also be governed by any unit prices and Addenda insofar as they may affect his part of the work or services.

   C. The work included in this division consists of the furnishing of all labor, equipment, transportation, excavation, backfill, supplies, material, appurtenances and services necessary for the satisfactory installation of the complete and operating Mechanical System(s) indicated or specified in the Contract Documents.

   D. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the Mechanical Systems in a substantial manner, in compliance with the requirements stated, implied or intended in the drawings and/or specifications, shall be included as part of this Contract.

   E. It is not the intent of this section of the specifications to make any Contractor, other than the General Contractor, responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be routed through the General Contractor to the Architect (if applicable), then to the Engineer. Also, this section of the specifications shall not be construed as an attempt to arbitrarily assign responsibility of work, material, equipment or services to a particular trade or Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be optional.

   F. It is the intent of this Contract to deliver to the Owners a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be the responsibility of the Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials required for the complete installation without additional cost to the Owner.

   G. In general, and to the extent possible, all work shall be accomplished without interruption of existing facilities operations. The Contractor shall advise the Owners at least two weeks prior to the interruption of any services or utilities. The Owners shall be advised of the exact time that interruption will occur and the length of time the interruption will last. Failure to comply with this requirement may result in complete work stoppage by the Contractors involved until a complete schedule of interruptions can be developed.

   H. Definitions and Abbreviations

      (1) Contractor - Any Contractor whether proposing or working independently or under the supervision of a General Contractor and/or Construction Manager and who installs any type of
mechanical work (Controls, Plumbing, HVAC, Sprinkler, Gas Systems, etc.) or, the General Contractor.

(2) Engineer - The Consulting Mechanical-Electrical Engineers either consulting to the Owners, Architect, other Engineers, etc. In this case: CMTA, Inc., Consulting Engineers.

(3) Architect - The Architect of Record for the project.

(4) Furnish - Deliver to the site in good condition and turn over to the Contractor who is to install.

(5) Provide - Furnish and install complete, tested and ready for operation.

(6) Install - Receive and place in satisfactory operation.

(7) Indicated - Listed in the Specifications, shown on the Drawings or Addenda thereto.

(8) Typical - Where indicated repeat this work, method or means each time the same or similar condition occurs whether indicated or not.

(9) Contract Documents - All documents pertinent to the quality and quantity of work to be performed on this project. Includes, but not limited to: Plans, Specifications, Instructions to Bidders, General and Special Conditions, Addenda, Alternates, Lists of Materials, Lists of Sub-Contractors, Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Schedules of Value, Periodical Payment Requests, Construction Contract with Owners, etc.

(10) Proposer - Any person, agency or entity submitting a proposal to any person, agency or entity for any part of the work required under this contract.

(11) OSHA - Office of Safety and Health Administration.

(12) KBC - Kentucky Building Code.

(13) The Project - All of the work required under this Contract.

(14) NEC - National Electrical Code.


(16) ASME - American Society of Mechanical Engineers.

(17) AGA - American Gas Association.

(18) SMACNA - Sheet Metal and Air Conditioning Contractors National Association.


(20) ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers.

(21) NEMA - National Electrical Manufacturers Association.

(22) UL - Underwriters Laboratories.
(23) ADA - Americans with Disabilities Act.

(24) IMC - International Mechanical Code.


(26) IFGC - International Fuel Gas Code.

I. Required Notices:

(1) Ten days prior to the submission of a proposal, each proposer shall give written notice to the Engineer of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, Proposers signify that they have included the cost of all required items in the proposal and that the Proposer will be responsible for the safe and satisfactory operation of the entire system.

2. INTENT

A. It is the intention of the Contract Documents to call for finished work, tested and ready for operation.

B. Details not usually shown or specified, but necessary for the proper installation and operation of systems, equipment, materials, etc., shall be included in the work, the same as if herein specified or indicated.

3. DRAWINGS AND SPECIFICATIONS

A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Engineer for approval before proceeding with the work. The drawings are not intended to show every item which may be necessary to complete the systems. All proposers shall anticipate that additional items may be required and submit their bid accordingly.

B. The drawings and specifications are intended to supplement each other. No Proposer shall take advantage of conflict between them, or between parts of either. Should this condition exist, the Proposer shall request a clarification not less than twelve days prior to the submission of the proposal so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be final.

C. The drawings and specifications shall be considered to be cooperative and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.

D. Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.

E. The Engineer shall reserve the right to make adjustments in location of piping, ductwork, equipment, etc. where such adjustments are in the interest of improving the project.
F. Should conflict or overlap (duplication) of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.

G. Unless dimensioned, the mechanical drawings only indicate approximate locations of equipment, piping, ductwork, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions, whether given in figures or scaled, shall be verified in the field to ensure no conflict with other work.

H. Each Proposer shall review all drawings including Architectural, Mechanical, Electrical, Structural, Surveys, etc., to ensure that the work he intends to provide does not encroach a conflict with or affect the work of others in any way. Where such effect does occur it shall be the Proposer's responsibility to satisfactorily eliminate any such encroachment conflict or effect prior to the submission of his proposal. Each Proposer shall in particular ensure that there is adequate space to install his equipment and materials. Failure to do so shall result in the correction of such encroachment conflict or effect of any work awarded the proposer and shall be accomplished fully without expense to others and that they are reasonably accessible for maintenance. Check closely all mechanical and electrical closets, chases, ceiling voids, wall voids, crawl spaces, etc., to ensure adequate spaces.

I. Where on the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornamentation or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.

J. Details not usually shown or specified, but necessary for the proper installation and operation of systems, equipment, materials, etc., shall be included in the work, the same as if herein specified or indicated.

K. Where on the Drawings or Addenda the word typical is used, it shall mean that the work method or means indicated as typical shall be repeated in and each time it occurs whether indicated or not.

L. Special Note: Always check ceiling heights indicated on Architectural Drawings and Schedules and ensure that they may be maintained after all mechanical and electrical equipment is installed. Do not install equipment in the affected area until the conflict is resolved.

4. EXAMINATION OF SITE AND CONDITIONS

A. Each Proposer shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, above and below grade, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. Each Proposer shall also fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of utilities, etc. His proposal shall cover all expenses or disbursements in connection with such matters and conditions. No allowance will be made for lack of knowledge concerning such conditions after bids are accepted.
A. When any Contractor requests approval of materials and/or equipment of different physical size, capacity, function, color, access, it shall be understood that such substitution, if approved, will be made without additional cost to anyone other than the Contractor requesting the change regardless of changes in connections, space requirements, electrical characteristics, electrical services, etc., from that indicated. In all cases where substitutions affect other trades, the Contractor requesting such substitutions shall advise all such Contractors of the change and shall remunerate them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Review of Shop Drawings by the Engineers does not in any way absolve the Contractor of this responsibility.

B. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make or catalog number, such reference shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; any devices, products, materials, fixtures, forms, or types of construction which, in the judgment of the Engineer, are equivalent to those specified are acceptable, provided the provisions of Paragraph (A) immediately preceding are met. Requested substitutions shall be submitted to the Engineer a minimum of twelve days prior to bids.

C. Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the Engineers.

D. Each Proposer shall furnish along with his proposal a list of specified equipment and materials which he is to provide. Where several makes are mentioned in the specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall choose any of the makes mentioned without change in price. Inclusion in this list shall not ensure that the Engineers will approve shop drawings unless the equipment, materials, etc., submitted in shop drawings is satisfactorily comparable to the items specified and/or indicated.

6. SUPERVISION OF WORK

A. The Contractor shall personally supervise the work for which he is responsible or have a competent superintendent, approved by the Engineers, on the work at all times during progress with full authority to act for him.

7. CODES, RULES, PERMITS, FEES, INSPECTIONS, REGULATIONS, ETC.

A. The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, inspections and other costs, including all utility connections, meters, meter settings, taps, tap fees, extensions, water and/or sewer system development charge, etc. in connection with his work. He shall also file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments and/or the appropriate municipality or utility company having jurisdiction, whether indicated or specified or not. He shall hire an independent Registered Engineer to witness installations and provide necessary certifications where required by utility companies, municipal agencies or others that have review authority. He shall also obtain all required certificates of inspection for his work and deliver same to the Engineers before request for acceptance and final payment for the work. Ignorance of Codes, Rules, Regulations, Laws, etc. shall not render the Contractor irresponsible for compliance. The Contractor shall also be versed in all Codes, Rules and Regulations pertinent to his part of the work prior to submission of a proposal.
B. The Contractor shall include in his work, without extra cost, any labor, materials, services, apparatus and drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not indicated or specified.

C. All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, with the requirements of local utility companies, or municipalities and with the requirements of all governmental agencies having jurisdiction.

D. All materials and equipment so indicated and all equipment and materials for the electrical portion of the mechanical systems shall bear the approval label of, or shall be listed by the Underwriters' Laboratories (UL), Incorporated. Each packaged assembly shall be approved as a package. Approval of components of a package shall not be acceptable. Where required by the Code and/or the Authority Having Jurisdiction, provide the services of a field labeling agency to provide a UL label for the entire system in the field under evaluation.

E. All plumbing work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Department of Health. Plumbing work shall not commence until such plans are in the hands of the Contractor.

F. All Heating, Ventilation and Air Conditioning work shall be accomplished in accordance with the Kentucky Building Code (KBC) and amendments thereto, the latest standards recognized by the American Society of Heating, Refrigerating and Air Conditioning and the National Fire Protection Association. Contractor shall secure a permit from the Division of HVAC. Final inspection certificate shall be provided by Contractor and a copy included in Operation and Maintenance Manuals.

G. The Contractor shall furnish three (3) copies of all Final Inspection Certificates obtained to the Engineer when work is complete. Final payment for work will be contingent upon compliance with this requirement.

H. Where minimum code requirements are exceeded in the Design, the Design shall govern.

I. The Contractor shall ensure that his work is accomplished in accord with the OSHA Standards and that he conducts his work and the work of his personnel in accord with same.

J. All work relating to the handicapped shall be in accord with regulations currently enforced by the Department of Housing, Buildings and Construction, Commonwealth of Kentucky and the American Disabilities Act.

K. All work in conjunction with a natural gas installation shall, in addition to all other Codes, Rules, Regulations, Standards, etc., comply with the requirements of the local gas supplier and/or standards and recommendations of the American Gas Association.

L. All work in relation to domestic water systems shall, in addition to all other Codes, Rules, Regulations and Standards, be in compliance with the requirements of the local water utility company and the adopted edition of the 10 States Standards.

M. All work in relation to the installation of sanitary or storm sewers shall, in addition to all other Codes, Rules, Regulations and Standards, be in compliance with the local agency governing such installations and the adopted edition of the 10 States Standards.
N. All work relating to the handicapped shall be in accord with regulations currently enforced by the Department of Housing, Buildings, and Construction, Commonwealth of Kentucky and the American Disabilities Act.

8. EQUIPMENT AND PIPING SUPPORT

A. Each piece of equipment, apparatus, piping, or conduit suspended from the structure or mounted above the floor level shall be provided with suitable structural support, pipe stand, platform or carrier in accordance with the best recognized practice. Such supporting or mounting means shall be provided by the Contractor for all equipment and piping. Exercise extreme care that structural members of building are not overloaded by such equipment. Provide any required additional bracing, cross members, angles, support, etc., as indicated or required by the Structural Engineer. This, in some instances, will require the Contractor to add an angle to a joist to transfer the load to a panel point. If in doubt, contact the Structural Engineer.

9. DUCT AND PIPE MOUNTING HEIGHTS

A. All exposed or concealed ductwork, piping, etc., shall be held as high as possible unless otherwise noted and coordinated with all other trades. Exposed piping and ductwork shall, insofar as possible, run perpendicular or parallel to the building structure.

10. COST BREAKDOWNS (SCHEDULE OF VALUES)

A. Within thirty days after acceptance of the Contract, the Contractor shall furnish to the Engineer, one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made in a format approved by the Engineer. Payments will not be made until satisfactory cost breakdowns are submitted.

11. CORRECTION PERIOD

A. All equipment, apparatus, materials, and workmanship shall be the best of its respective kind. The Contractor shall replace all parts at his own expense, which are proven defective as described in the General Conditions. The effective date of completion of the work shall be the date of the Architect's or Engineer's Statement of Substantial Completion. Items of equipment which have longer guarantees, as called for in these specifications, shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall not invalidate the guarantee except that the Owner shall be liable for any damage to equipment during this period, due to negligence of his operator or other employees. Refer to other sections for any special or extra warranty requirements.

B. It is further clarified that all required and specified warranties shall begin on the date of Substantial Completion, not at the time of equipment start-up.

C. All compressors shall have five year warranty.

12. COMPUTER-BASED SYSTEM SOFTWARE
A. For all equipment, controls, hardware, computer-based systems, programmable logic controllers, and other materials provided as a part of the work, software that is installed shall be certified in writing to the Engineer and Owner by the manufacturer and/or writer to be free of programming errors that might affect the functionality of the intended use.

13. CHANGES IN MECHANICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

14. CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

15. SURVEY, MEASUREMENTS AND GRADE

A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.

B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.

C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the contract documents, he shall promptly notify the Engineer and shall not proceed with this work until he has received instructions from the Engineer on the disposition of the work.

16. TEMPORARY USE OF EQUIPMENT

A. The permanent heating and plumbing equipment, when installed, may be used for temporary services, with the consent of the Engineers. Should the permanent systems be used for this purpose the Contractors shall make all temporary connections required at their expense. They shall also make any replacement required due to damage wear and tear, etc., leaving the same in "as new" condition.

B. Permission to use the permanent equipment does not relieve the Contractors from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

C. During all phases of construction:

(1) Air Handling Units:

a. At a minimum, four complete sets of filter media are required for each unit. In each unit, install two sets of filter media during construction (more shall be required if construction activities dictate more frequent changes). In each unit, install one set of filter media at substantial completion. Leave one set of filter media in boxes in appropriate mechanical room as a spare set for the Owner. All other filters shall be used by the Contractor during construction. Dispose of all construction filter media.

b. On the outside of all return air openings install a minimum of two sets of fiberglass filter
media, such as cheesecloth, to be utilized as pre-filters for the “construction” filters. Install first set upon start-up and then install second set when first set is dirty. Dispose of all dirty construction filters. Change filters as often as necessary to keep units from becoming dirty at no additional cost.

c. At substantial completion of the project the entire unit shall be cleaned to present a like “new” unit for the Owner and all filters shall be replaced with new.

17. TEMPORARY SERVICES

A. The Contractor shall arrange any temporary water, electrical and other services which he may require to accomplish his work. Refer also to General and Special Conditions.

18. RECORD DRAWINGS

A. The Contractor shall ensure that any deviations from the Design are as they occur recorded in red, erasable pencil on record drawings kept at the jobsite. The Engineer shall review the record documents from time to time to ensure compliance with this specification. Compliance shall be a contingency of final payment. Pay particular attention to the location of under floor sanitary and water lines, shut-off valves, cleanouts and other appurtenances important to the maintenance and operation of Mechanical Systems. Also, pay particular attention to Deviations in the Control Systems and all exterior utilities. Keep information in a set of drawings set aside at the job site especially for this purpose. Deliver these record drawings to the Engineer.

19. MATERIALS AND WORKMANSHIP

A. All equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. Each Proposer shall determine that the materials and/or equipment he proposes to furnish can be brought into the building(s) and installed within the space available. In certain cases, it may be necessary to remove and replace walls, floors and/or ceilings and this work shall be the responsibility of the Contractor. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement of filters, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s). Ensure, through coordination, that no other Contractor seals off access to space required for equipment, materials, etc.

B. Materials and equipment, where applicable, shall bear Underwriters' Laboratories label where such a standard has been established.

C. Use extreme care in the selection of equipment and its installation to ensure that noise and vibration are kept at a minimum. The Engineer's determination shall be final and corrections to such discrepancies shall be made at the cost of the Contractor.

D. Each length of pipe, fitting, trap, fixture and device used in the plumbing or drainage systems shall be stamped or indelibly marked with the weight or quality thereof and with the manufacturer's mark or name.

E. All equipment shall bear the manufacturer's name and address. All electrically operated equipment shall bear a data plate indicating required horsepower, voltage, phase and ampacity.

20. COOPERATION AND COORDINATION WITH OTHER TRADES
A. The Contractor shall give full cooperation to all other trades and shall furnish in writing with copies to the Engineer, any information necessary to permit the work of other trades to be installed satisfactorily and with the least possible interference or delay.

B. Where any work is to be installed in close proximity to, or will interfere with work of other trades, each shall cooperate in working out space conditions to make a satisfactory adjustment. If so directed by the Engineer, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than 1/4” = 1'-0", clearly indicating how his work is to be installed in relation to the work of other trades, or so as not to cause any interference with work of other trades. He shall make the necessary changes in his work to correct the condition without extra charge.

C. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

21. QUALIFICATIONS OF WORKMEN

A. All mechanical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen, as evidenced by their workmanship, shall be summarily relieved of their responsibilities in areas of incompetency. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workman shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of Architect, Contractor, etc.

* EDIT IF NOT KENTUCKY PROJECT

B. All plumbing work shall be accomplished by Journeymen Plumbers under the direct supervision of a Master Plumber as defined and clarified under Kentucky State Plumbing Law Regulations and Code. Proof and Certification may be requested by the Engineer.

C. All sheet metal, insulation and pipe fitting work shall be installed by workmen normally engaged or employed in these respective trades, except where only small amounts of such work are required and are within the competency of workmen directly employed by the Contractor involved.

D. All automatic control systems shall be installed by workmen normally engaged or employed in this type work, except in the case of minor control requirements (residential type furnaces, packaged HVAC equipment with integral controls, etc.) in which case, if a competent workman is the employee of this Contractor, he may be utilized subject to review of his qualifications by the Engineer and after written approval from same.

22. CONDUCT OF WORKMEN

A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workman to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption of alcoholic beverages or other intoxicants, narcotics, barbiturates, hallucinogens or debilitating drugs on the job site is strictly forbidden.

23. PROTECTION OF MATERIALS AND EQUIPMENT
A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from physical, sun, and weather damage during the construction period. Such protection shall be by a means acceptable to the manufacturer and Engineer. All rough-in soil, waste, vent and storm piping, ductwork, etc., shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged, stolen or vandalized while stored on site, either before or after installation, shall be repaired or replaced by the Contractor at his own expense.

24. SCAFFOLDING, RIGGING AND HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting and services necessary for erection and delivery onto the premises of any equipment and apparatus furnished. All such temporary appurtenances shall be set up in strict accord with OSHA Standards and Requirements. Remove same from premises when no longer required.

25. BROKEN LINES AND PROTECTION AGAINST FREEZING

A. No conduits, piping, troughs, etc. carrying water or any other fluid subject to freezing shall be installed in any part of the building where danger of freezing may exist without adequate protection being given by the Contractor whether or not insulation is specified or indicated on the particular piping. All damages resulting from broken and/or leaking lines shall be replaced or repaired at the Contractor's own expense. If in doubt, contact the Engineer. Do not install piping across or near openings to the outside whether they are carrying static or moving fluids or not. Special Note: Insulation on piping does not necessarily ensure that freezing will not occur.

26. CLEANING

A. The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish and debris caused by his operations; and at the completion of the work, shall remove all rubbish, debris, all of his tools, equipment, temporary work and surplus materials from and about the premises, and shall leave the area clean and ready for use. If the Contractor does not attend to such cleaning upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the Contractor. The Contractor shall be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.

B. After completion of all work and before final acceptance of the work, the Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of piping, equipment, fixtures and all other associated or adjacent fabrication.

27. CONCRETE WORK

A. The Contractor shall be finally responsible for the provisions of all concrete work required for the installation of any of his systems or equipment. He may, at his option, arrange with the others to provide the work. This option, however, will not relieve the Contractor of his responsibilities relative to dimensions, quality of workmanship, locations, etc. In the absence of other concrete specifications, all concrete related to Mechanical work shall be 3000 psi minimum compression strength at 28 days curing and shall conform to the standards of the American Concrete Institute Publication AC1-318. Heavy equipment shall not be set on pads for at least seven (7) days after pour. Insert 6-inch steel dowel rods into floors to anchor pads.

28. NOISE, VIBRATION OR OSCILLATION

GENERAL PROVISIONS – MECHANICAL
BLUEGRASS LEXINGTON AIRPORT
GENERAL AVIATION FACILITY
SCB # 1508
GENERAL PROVISIONS – MECHANICAL
BLUEGRASS LEXINGTON AIRPORT
GENERAL AVIATION FACILITY
SCB # 1508

A. All work shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Engineer. In case of moving machinery, sound or vibration noticeable outside of room in which it is installed, or annoyingly noticeable inside its own room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor at his expense.

B. All equipment subject to vibration and/or oscillation shall be mounted on vibration supports whether indicated or not suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc. by means of flexible connectors, vibration absorbers, or other approved means. Unitary equipment, such as small room heating units, small exhaust fans, etc., shall be rigidly braced and mounted to wall, floor or ceiling as required and tightly gasketed and sealed to mounting surface to prevent air leakage and to obtain quiet operation. Flush and surface mounted equipment such as diffusers, grilles, etc., shall be gasketed and affixed tightly to their mounting surface.

C. The Contractor shall provide supports for all equipment furnished by him. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment, piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. If strength of supporting structural members is questionable, contact Engineers.

29. ACCESSIBILITY

A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of his work. He shall cooperate with all others whose work is in the same space. Such spaces and clearances shall, however, be kept to the minimum size required.

B. The Contractor shall locate and install all equipment so that it may be serviced, and maintained as recommended by the manufacturer. Allow ready access and removal of the entire unit and/or parts such as valves, filters, fan belts, motors, prime shafts, etc.

C. The contractor shall provide access panels for each concealed valve, control damper or other device requiring service as shown on the engineer’s plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work.

30. RESTORATION OF NEW OR EXISTING SHRUBS, PAVING, SURFACES, ETC.

A. The Contractor shall at his expense restore to their original conditions all paving, curbing, surfaces, drainage ditches, structures, fences, shrubs, existing or new building surfaces and appurtenances, and any other items damaged or removed by his operations. Replacement and repairs shall be in accordance with good construction practice and shall match materials employed in the original construction of the item and shall be to the satisfaction of the Architect and/or Engineer.

31. MAINTENANCE OF EXISTING UTILITIES AND LINES

A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that comes within the contract construction site, shall be subject to continuous uninterrupted service with no other exception than the Owner of the utilities permission to interrupt same temporarily.
B. Utilities and lines, where known, are indicated on the drawings. Locations and sizes are approximate. Prior to any excavation being performed, the Contractor shall ascertain that no utilities or lines are endangered by new excavation. Exercise extreme caution in all excavation work.

C. If utilities or lines occur in the earth within the construction site, the Contractor shall probe and locate the lines prior to machine excavation or blasting in the respective area.

D. Cutting into existing utilities and services where required shall be done in coordination with and only at times designated by the Owner of the utility.

E. The Contractor shall repair to the satisfaction of the Engineer, any surfaces or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.

F. Machine excavation shall not be permitted with ten feet of electrical lines or lines carrying combustible and/or explosive materials. Hand excavate only.

G. Protect all new or existing lines from damage by traffic, etc. during construction. Repairs or replacement of such damage shall be at the sole expense of the party responsible.

32. SMOKE AND FIRE PROOFING

A. The Contractor shall fire and smoke stop all openings made in fire or smoke rated walls, chases, ceilings and floors in accord with the KBC. Patch all openings around ductwork and piping with appropriate type material to stop smoke at smoke walls and provide commensurate fire rating at fire walls, floors, ceilings, roofs, etc. Back boxes in rated walls shall be a minimum distance apart as allowed by code to maintain the rating. If closer provide rated box or fireproofing in code approved manner.

33. MOTORS

A. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with standards of A.S.A. C50, conforming to this and all applicable standards for insulation resistance and dielectric strength.

B. Each motor shall be provided by the equipment supplier, installer or manufacturer with conduit terminal box, and N.E.C. required disconnecting means as specified or required. Three-phase motors shall be provided with external thermal overload protection in their starter units. Single-phase motors shall be provided with thermal overload protection, integral to their windings or external, in control unit. All motors shall be installed with NEMA-rated starters as specified and shall be connected per the National Electrical Code.

C. The capacity of each motor shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or specified. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower. Motors producing excessive noise or vibration shall be replaced by the responsible contractor. See Division 26 of Specifications for further requirements related to installation of motors.

34. CUTTING AND PATCHING
A. The Contractor shall provide his own cutting and patching necessary to install his work. Patching shall match adjacent surfaces and shall be to the satisfaction of the Architect and Engineer.

B. No structural members shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.

C. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

35. CURBS, PLATES, ESCUTCHEONS & AIR TIGHT PENETRATIONS

A. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4 inch high by 3 inch wide concrete curb.

B. Escutcheon plates shall be provided for all pipes and conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

C. Seal all duct, pipe, conduit, etc., penetrations through walls and floors air tight. If wall or floor assembly is rated then use similarly rated sealing method.

36. WEATHERPROOFING

A. Where any work pierces waterproofing including waterproof concrete, the method of installation shall be as approved by the Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings permanently watertight.

37. OPERATING INSTRUCTIONS, MAINTENANCE MANUALS AND PARTS LISTS

A. Upon completion of all work tests, the Contractor shall instruct the Owner or his representative(s) fully in the operations, adjustment and maintenance of all equipment furnished. The time and a list of representatives required to be present will be as directed by the Engineer. Turn over all special wrenches, keys, etc., to the owner at this time.

B. The Contractor shall furnish three (3) complete bound sets for delivery to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs alone will not be acceptable for operating and maintenance instructions.

C. The Contractor, in the instructions, shall include a preventive maintenance schedule for the principal items of equipment furnished under this contract and a detailed, parts list and the name and address of the nearest source of supply.

D. The Contractor shall frame under Lexan in the main mechanical room all temperature control diagrams and all piping diagrams.

38. PAINTING
A. In general, all finish painting shall be accomplished under the Painting Section of the specifications by the Contractor; however, unless otherwise specified under other sections of these specifications, the following items shall be painted:

(1) All exposed piping, valve bodies and fittings (bare and insulated), including hangers, platforms, etc.

(2) All mechanical equipment not factory finished. Aluminum and stainless steel equipment, motors, identification plates, tags, etc. shall not be painted. All rust and foreign matter shall be thoroughly removed from surfaces prior to painting. All baked enamel factory finish of equipment which may have been scratched or chipped shall be touched up with the proper paint as recommended and supplied by the manufacturer.

(3) All ductwork exposed in finished areas (bare and insulated), all grilles, diffusers, etc. not factory finished. Paint the inside surfaces of all interior duct surfaces visible from any register, grille or diffuser opening on all jobs; surfaces shall receive one (1) prime coat of Rustoleum 1225 red "galvinoleum" or other approved equivalent primer and rust inhibitor and one (1) coat of Rustoleum 1579 jet black "Speedy Dry" enamel or approved equivalent applied in accordance with the manufacturer’s recommendations.

(4) All insulated piping, ductwork and equipment shall be properly prepared for painting by the Contractor where mechanical items are to be painted. In the case of externally insulated duct and pipe, the Contractor shall provide 6 oz. canvas jacket with fire retardant lagging. The jacket shall be allowed to dry properly before applying paint to avoid shrinking after painting and exposing unpainted surfaces. The Contractor, at his option, may provide double wall ductwork in lieu of externally insulated ductwork with canvas jacket and lagging.

39. ELECTRICAL CONNECTIONS

A. The Contractor shall furnish and install all (1) temperature control wiring; (2) equipment control wiring and (3) interlock wiring. The Contractor shall furnish and install all power wiring complete from power source to motor or equipment junction box, including power wiring thru starters, and shall furnish and install all required starters not factory mounted on equipment.

B. The Contractor shall, regardless of voltage, furnish and install all temperature control wiring and all associated interlock wiring, all equipment control wiring and conduit for the equipment that the Contractor furnishes. He may, at his option, employ at his own expense, the Electrical Contractor to accomplish this work.

C. After all circuits are energized and completed, the Contractor shall be responsible for all power wiring, and all control wiring shall be the responsibility of the Contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.

D. The Contractor shall furnish motor starters of the type and size required by the manufacturer for all equipment provided by him, where such starters are necessary. Starters shall have overloads for each phase.

40. FINAL CONNECTIONS TO EQUIPMENT

A. The Contractor shall finally connect to mechanical services, any terminal equipment, appliances, etc., provided under this and other divisions of the work. Such connections shall be made in strict
accord with current codes, safety regulations and the equipment manufacturer’s recommendations. If in doubt, contact the Engineers prior to installation.

41. REQUIRED CLEARANCE FOR ELECTRICAL EQUIPMENT

A. The NEC has specific required clearances above, in front, and around electrical gear, panels etc. The Contractor shall not install any piping, ductwork, etc., in the required clearance. If any appurtenance is located in the NEC required clearance, it shall be relocated at no additional cost.

42. INDEMNIFICATION

A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

43. HAZARDOUS MATERIALS

A. The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, ensure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall ensure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.

B. CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.

C. If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor’s sole responsibility to contact the Owner and so advise him immediately.

D. The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

44. ABOVE-CEILING AND FINAL PUNCH LISTS

A. The Contractor shall review each area and prepare a punch list for each of the subcontractors, as applicable, for at least two stages of the project:
(1) For review of above-ceiling work that will be concealed by tile or other materials well before substantial completion.
(2) For review of all other work as the project nears substantial completion.

B. When all work from the Contractor's punch list is complete at each of these stages and prior to completing ceiling installations (or at the final punch list stage), the Contractor shall request that the Engineer develop a punch list. This request is to be made in writing seven days prior to the proposed date. After all corrections have been made from the Engineer's punch list, the Contractor shall review and initial off on each item. This signed-off punch list shall be submitted to the Engineer. The Engineer shall return to the site once to review each punch list and all work prior to the ceilings being installed and at the final punch list review.

END OF SECTION 200100
SECTION 200200- SCOPE OF THE MECHANICAL WORK

1. GENERAL

A. The Mechanical work for this Contract shall include all labor, materials, equipment, fixtures, excavation, backfill and related items required to completely install, test, place in service and deliver to the Owner the complete mechanical systems in accordance with the accompanying plans and all provisions of these specifications. This work shall primarily include, but is not necessarily limited to the following:

(1) Interior domestic hot, cold and recirculating hot water system.
(2) Interior soil, waste and vent systems.
(3) All plumbing equipment, fixtures and fittings.
(4) All mechanical exhaust systems.
(5) All insulation associated with mechanical systems.
(6) Condensate drainage systems.
(7) Complete heating, ventilation and air conditioning systems.
(8) Final connection of all mechanical furnished by others (e.g., kitchen equipment).
(9) Complete balancing of air and water systems.
(10) Complete natural gas piping systems.
(11) All applicable services and work specified in Section 200100; General Provisions - Mechanical.
(12) All specified or required control work.
(13) Provide all required motor starters, etc. not provided under the electrical sections.
(14) One year guarantee of all mechanical equipment, materials and workmanship.
(15) Thorough instruction of the owner’s maintenance personnel in the operation and maintenance of all mechanical equipment.
(16) Thorough coordination of the installation of all piping, equipment and any other material with other trades to ensure that no conflict in installation.
(17) Approved supervision of the mechanical work.
(18) Excavation, backfilling, cutting, patching, sleeving, concrete work, etc., required to construct the mechanical systems.
(19) Procurement of all required permits and inspections, including fees for all permits and inspection services and submission of final certificates of inspection to the Engineers (Plumbing, HVAC, etc.).

(20) Factory start-up of all major equipment (including terminal HVAC equipment) and submission of associated factory start-up reports to the Engineer.

END OF SECTION 200200
SECTION 200300 - SHOP DRAWINGS, DESCRIPTIVE LITERATURE, MAINTENANCE MANUALS, PARTS LISTS, SPECIAL KEYS & TOOLS

1. GENERAL

A. The Contractor's attention is directed also to the General and Special Conditions and Section 200100 - General Provisions - Mechanical as well as to all other Contract Documents as they may apply to his work.

B. The Contractor shall prepare and submit to the Engineer, through the General Contractor and the Architect (where applicable) within thirty (30) days after the date of the Contract, an electronic copy of all shop drawings, certified equipment drawings, installation, operating and maintenance instructions, samples, wiring diagrams, etc. on all items of equipment specified hereinafter.

C. Submittal data shall include specification data including metal gauges, finishes, accessories, etc. Also, the submittal data shall include certified performance data, wiring diagrams, dimensional data, and a spare parts list. Submittal data shall be reviewed by the Engineer before any equipment or materials is ordered or any work is begun in the area requiring the equipment.

D. All submittal data shall have the stamp of approval of the Contractor submitting the data as well as the General Contractor and the Architect (if applicable) to show that the drawings have been reviewed by the Contractor. Any drawings submitted without these stamps of approval may not be considered and will be returned for proper resubmission.

E. It shall be noted that review of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.

F. The Engineers review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for: adaptability of the item to the project; compliance with applicable codes, rules, regulations and information that pertains to fabrication and installation; dimensions and quantities; electrical characteristics; and coordination of the work with all other trades involved in this project. Any items that differ from the Drawings or Specifications shall be flagged by the Contractor so the Engineer will be sure to see the item. Do not rely on the Engineer to “catch” items that do not comply with the Drawings or Specifications. The Contractor is responsible for meeting the Drawings and Specification requirements, regardless of whether or not something does not get caught by the Contractor or Engineer during shop drawing reviews.

G. Equipment shall not be ordered and no final rough-in connections, etc., shall be accomplished until reviewed equipment shop drawings are in the hands of the Contractor. It shall be the Contractor's responsibility to obtain reviewed shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. The Contractor shall coordinate with all the other trades having any connections, roughing-in, etc. to the equipment.

H. If the Contractor fails to comply with the requirements set forth above, the Engineer shall have the option of selecting any or all items listed in the Specifications or on the drawings; and the Contractor shall be required to furnish all materials in accordance with this list.
I. Colors for equipment in other than mechanical spaces shall be selected from the Manufacturer's standard and factory optional colors. Color samples shall be furnished with the shop drawing submission for such equipment.

J. Shop Drawing Submittals

(1) All submittals for HVAC equipment shall include all information specified. This shall include air and water pressure drops, RPM, noise data, face velocities, horsepower, voltage motor type, steel or aluminum construction, and all accessories clearly marked.

(2) All items listed in the schedules shall be submitted for review in a tabular form similar to the equipment schedule.

(3) All items submitted shall be designated with the same identifying tag as specified on each sheet.

(4) Any submittals received in an unorganized manner without options listed and with incomplete data will be returned for resubmittal.

2. SHOP DRAWINGS

Shop Drawings, descriptive literature, technical data and required schedules shall be submitted on the following:

- Duct Insulation (Internal and External)
- Condensing units
- Pipe Insulation
- Hydronic Specialties
- Heat Pumps
- Air Handling Units
- Plumbing Fixtures

3. SPECIAL WRENCHES, TOOLS, ETC.

(1) The Contractor shall furnish, along with equipment provided, any special wrenches or tools necessary to dismantle or service equipment or appliances installed under the Contract. Wrenches shall include necessary keys, handles and operators for valves, cocks, hydrants, etc. A reasonable number of each shall be furnished.

4. BALANCE REPORTS

A. Upon substantial completion of the project, the Contractor shall submit to the Engineers four (4) bound copies of the Certified Air and Hydronic Balance Report.

END OF SECTION 200300
SECTION 200400 - DEMOLITION AND SALVAGE

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

2. DEMOLITION

A. INTENT

It is the intent of this section to completely remove all components of any existing mechanical system no longer in use that will be open to view in, or will interfere with the operations of the completed building, or which will, in any way, interfere with project construction. Components of the existing mechanical systems which do not meet the above criteria, may be abandoned in place in a safe, workmanlike, code approved manner.

B. PLUMBING

(1) All existing piping not to be reused, shall be removed when located in accessible chases, accessible ceiling spaces, crawl spaces, mechanical rooms, exposed, etc.

(2) Unless otherwise indicated, the Contractor shall be responsible for patching and repairing all holes, etc. in the ceilings, walls, and floors where plumbing piping is removed.

(3) All lines abandoned in place shall be made safe in compliance with the Kentucky Plumbing Code.

C. HVAC

(1) Remove from the project area all piping not to be reused and hangers, specialties, etc. that are accessible or that become accessible during construction and/or interfere in any way with any part of the construction or would be exposed in the completed building.

(2) Remove all temperature controls and related items that are accessible or become accessible during construction.

(3) Remove all existing heating and ventilating equipment not indicated to be reused from the building.

(4) The Contractor shall be responsible for the removal and/or relocation of any HVAC piping, equipment, fittings, valves, etc. which may, in the course of construction, interfere with the installation of any new and/or relocated Architectural, Structural, Mechanical or Electrical Systems at no increase in the contract price.

(5) Unless otherwise indicated, the Contractor shall be responsible for the patching and repairing of all holes, etc. in the ceiling, wall and floors where HVAC equipment is removed.
(6) Unless otherwise noted, when removing equipment sitting on a concrete pad, also remove the concrete pad and patch and repair floor to match adjacent surfaces.

END OF SECTION 200400
SECTION 201100 - SLEEVING, CUTTING, PATCHING AND REPAIRING

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

B. The Contractor shall be responsible for all openings, sleeves, trenches, etc., that he may require in floors, roofs, ceilings, walls, etc., and shall coordinate all such work with the General Contractor and all other trades. Coordinate with the General Contractor, any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the Contractor.

C. The Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for piping, ductwork, conduit, etc., to go through; however, when this is not done, the Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Engineer. Any damage caused to the buildings by the workmen of the responsible Contractor must be corrected or rectified by him at his own expense.

D. The Contractor shall notify other trades in due time where he will require openings or chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.

E. The Contractor shall be responsible for properly shoring, bracing, supporting, etc., any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements shall be promptly and properly made good to the satisfaction of the Engineer.

F. All work improperly done or not done at all as required by the Mechanical Trades in this section, will be performed by the Contractor at the direction of the trade whose work is affected.

2. SLEEVES, PLATES AND ESCUTCHEONS

A. The Contractor shall provide and locate all sleeves and inserts required for his work before the floors and surface being penetrated are built, otherwise the Contractor shall core drill for pipes where sleeves and inserts were not installed, or where incorrectly located. Core drilling is the only acceptable alternative to sleeves. Do not chisel openings. Where sleeves are placed in exterior walls or in slabs on grade, the space between the pipe or conduit and the sleeves shall be made completely and permanently water tight.

B. Pipe that penetrates fire and/or smoke rated assemblies shall have sleeves installed as required by the manufacturer of the rating seal used.

C. At all other locations either pipe sleeves or core drilled openings are acceptable.

D. Where thermal expansion does not occur, the wall may be sealed tight to the pipe or insulation.
E. Insulation, that requires a vapor barrier (i.e., cold water or refrigerant piping, etc.), must be continuous through the sleeve/cored hole. For other piping, insulation may stop on either side of the sleeve.

F. Sleeves shall be constructed of 24 gauge galvanized sheet steel with lock seam joints or Schedule 40 pipe. Sleeves in floors shall extend 1" above finished floor level.

G. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction.

H. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4 inch high by 3 inch wide concrete curb.

I. Escutcheon plates shall be provided for all pipes and conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

3. PATCHING AND REPAIRING

A. Patching and repairing made necessary by work performed under this division shall be included as a part of the work and shall be done by skilled mechanics of the trade or trades for work cut or damaged, in strict accordance with the provisions herein before specified for work of like type to match adjacent surfaces and in a manner acceptable to the Engineer.

B. Where portions of existing lawns, shrubs, paving, etc. are disturbed for installation of work of this Division, such items shall be repaired and/or replaced to the satisfaction of the Engineer.

C. Where the installation of conduit, ducts, piping, etc. requires the penetration of fire or smoke rated walls, ceilings or floors, the space around such conduit, duct, pipe, etc., shall be tightly filled with an approved non-combustible fire insulating material satisfactory to maintain the rating integrity of the wall, floor or ceilings affected.

D. Where ducts penetrate fire rated assemblies, fire dampers shall be provided with an appropriate access door.

E. Piping passing through floors, ceilings and walls in finished areas, unless otherwise specified, shall be fitted with chrome plated brass escutcheons of sufficient outside diameter to amply cover the sleeved openings and an inside diameter to closely fit the pipe around which it is installed.

F. Stainless steel collars shall be provided around all ducts, large pipes, etc., at all wall penetrations; both sides.

G. Where ducts, pipes, and conduits pass through interior or exterior walls, the wall openings shall be sealed air tight. This shall include sealing on both sides of the wall to insure air does not enter or exit the wall cavity. This is especially critical on exterior walls where the wall cavity may be vented to the exterior.

H. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid
insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

END OF SECTION 201100
SECTION 201200 - EXCAVATION, TRENCHING, BACKFILLING AND GRADING

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

B. The Contractor shall include all excavating, filling, grading, and related items required to complete his work as shown on the drawings and specified herein or as required to complete, connect and place all mechanical systems in satisfactory operation.

C. Unless otherwise shown or required, provide separate trenches for sewers, water lines and other underground raceways, with a minimum of 10 feet measured from outside diameter between pipes. In locations, such as close to buildings where separate trenches for sewers and water lines are impractical, lay the water pipe on a solid shelf at least 2'-0" above the top of the sewer and 2'-0" to the side. Electric and fuel lines shall always be placed in a separate trench. All exterior lines shall have a minimum earth cover of thirty (30) inches to top of pipe, unless otherwise indicated.

D. Water lines crossing under sewer lines, or crossing less than 2 feet above sewer lines, must be encased for a distance not less than 5 feet on either side of the point of crossover.

2. SUBSURFACE DATA

A. Materials to be excavated shall be unclassified, and shall include earth, rock, or any other material encountered in the excavating to the depth and extent indicated on the drawings and specified herein. No adjustment in the Contract sum will be made on account of the presence or absence of rock, shale, or other materials encountered in the excavating. This paragraph is written to include the removal of all rock with no extras, whether rock is indicated or not.

3. BENCH MARKS AND MONUMENTS

A. Maintain carefully all bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed.

4. EXCAVATION

A. Excavate trenches of sufficient width for proper installation of the work. When the depth of backfill over sewer pipe exceeds 10 feet, keep the trench at the level of the top of the pipe as narrow as practicable. Trench excavation for piping eight inches and smaller shall not exceed thirty inch width for exterior lines and twenty-four inch width for interior lines.

B. Sheet and brace trenches as necessary to protect workmen and adjacent structures. Comply with local regulations or, in the absence thereof, with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc., and current OSHA Standards. Do not remove sheeting until trench is backfilled sufficiently to protect pipe and prevent injurious caving. Where removal of sheeting and/or bracing is hazardous, leave in place. Cut off such sheeting not to be removed at least 3 feet below finished grade.

C. Rules and regulations governing the respective utilities shall be observed in executing all work under this heading. Active utilities discovered in the course of excavation shall be protected or
relocated in accordance with written instructions from the Engineer. Inactive and abandoned utilities encountered in trenching operations shall be removed and abandoned with ends plugged or capped in accord with current codes and safe practice. If in doubt, contact Engineers. Machine excavation shall not be allowed within ten (10) feet of existing electric lines or lines carrying combustible materials. Use only hand tools.

D. The removal of rock shall be accomplished by use of hand or power tools only. Blasting shall not be permitted unless authorized in writing by the Engineer. Any damage to existing structures, exterior services, or rock intended for bearing, shall be corrected at the Contractor's expense.

E. Perform final grading of trench bottoms by hand tools; carry machine excavation only to such depth that soil bearing for pipes and raceways will not be disturbed. Grade the bottom of trenches evenly to insure uniform bearing for all piping and raceways. Cut bell holes as necessary for joints and jointmaking. Except as hereinafter specified, bottom of trenches for bell and spigot pipe, flanged pipe, etc. shall be shaped to the lower quadrant of pipe with additional excavation for bell or flange. Piping installed where it rests on bell, or flange and/or is supported with blocks or wedges will not be accepted.

F. Keep trenches free from water while construction therein is in progress. Under no circumstances lay pipe or appurtenances in water. Pump or bail water from bell holes to permit proper jointing of pipe. Any water pumping from this Contractor's trenches which is required during construction, shall be included in this Contract.

G. In no case shall excavation work be accomplished that will damage in any way the new structure, existing structures, equipment, utility lines, large trees to remain, etc. The Contractors shall take the necessary steps to prevent flow of eroded earth by water or landslide onto the property of others, or against the structures. The repair of all such damage or any other damage incurred in the course of excavation shall be borne by the responsible Contractor.

H. Use surveyor's level to establish elevations and grades.

I. The Contractor shall accept the site as he finds it and remove all trash, rubbish and material from the site prior to starting excavation of his work.

J. The Contractor shall provide and maintain barricades and temporary bridges around excavations as required for safety. Temporary bridges shall be provided where excavations cross paved areas and walks. The Contractor shall maintain these bridges in a safe and passable condition for all traffic until removal. Refer to OSHA Standards for such installations and comply with same in all details.

K. Pay particular attention to existing utilities and lines to avoid damage. The locations of existing lines which are indicated on the plans were taken unconfirmed from drawings prepared for previous construction and locations are approximate only. Also, certain water, gas, electric, storm and sanitary sewer lines and other underground appurtenances, active or abandoned, may not appear on the drawings. It shall be each Mechanical Contractor's responsibility to ascertain the location of all lines and excavate with caution in their area.

5. BACKFILL AND SURFACE REPAIR

A. Backfilling for mechanical work shall include all trenches, manhole pits, storage tank pits, and/or any other earth and/or rock openings which are excavated under this Contract. Backfilling shall be carefully performed and the surface restored to its original level to receive new finish.
Wherever trenches and earth openings have not been properly filled and/or settlement occurs, they shall be re-excavated, re-filled and properly compacted, smoothed off and finally made to conform to the level of the original ground surface.

B. Unless otherwise indicated or specified, all piping shall be bedded on four (4) inches minimum of compacted naturally or artificially graded mixture of crushed gravel, crushed stone, or crushed sand with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve on undisturbed soil excavated as described hereinbefore. Install tracer wire above pipe. Cover the pipe with twelve (12) inches of compacted backfill to prevent settlement above and around the new pipe. The backfill shall be naturally or artificially graded mixture of crushed gravel, crushed stone, or crushed sand with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve. Prior to placing this second level of backfill, apply all required coatings and coverings to pipe, apply required tests and check the grading of the pipe to insure that it is correct and that the pipe is free of swags, bows or bends. Also check lines for leaks at this point and repair as required. Once all of the preceding is accomplished, continue backfill with clean, debris and rock free earth tamped at six (6) inch intervals. Finish the backfill as specified following. Note: Water settling of backfill will be permitted only as an aid to mechanical compacting.

(1) When installing any type of pipe below building footing, parallel or perpendicular to the footing, the area underneath the footing and in the zone of influence shall be backfilled with cementitious flowable fill. The zone of influence is the area within a 45 degree angle projecting down from the bottom edge of footers on all sides of the footing. Piping within flowable fill shall be isolated from the fill by a layer of heavy duty felt paper. Piping installed in trenches backfilled with flowable fill shall be anchored to the soil below prior to backfilling.

C. Backfill beneath areas to be seeded or sodded within six (6) inches of finished grade. The remaining six (6) inches shall be backfilled with clean top soil.

D. Backfill beneath paved areas, walks, etc. shall be brought to proper grade to receive the sub-base and paving. No paving shall be placed on uncompacted fill or unstable soil.

E. Wherever, in the opinion of the Engineer, the soil at or below the requisite pipe grade is unsuitable for supporting piping, special support shall be provided as directed by the Engineer.

F. Unsuitable material and surplus excavated material not required for backfill shall be removed from the site. The location of dump and length of haul shall be the affected Contractor's responsibility.

G. Provide and place any additional fill material from off the site as may be required for backfill. Fill obtained from off site shall be of kind and quality as specified for backfill and the source approved by the Engineer and shall be brought to the site by the Contractor requiring the fill.

H. In the absence (if not specified or indicated elsewhere in the drawings or specifications to be done by others) of such work by others, the Contractor shall lay new sod over his excavation work. Level, compress and water in accord with sound sodding practice.

I. When running any type of piping below a footer or in the zone of influence the piping shall be backfilled with cementitious flowable fill. The zone of influence is the area under the footer within a 45 degree angle projecting down from the bottom edge of the footer on all sides of the footer. Additionally, grease traps, manholes, vaults, and other underground structures shall be held away from building walls far enough to be outside of the zone of influence.
J. Warning Tape and Tracer Wire

Provide a yellow and black plastic tape in all trenches 6” above the buried utility that identifies the utility about to be encountered. For non-metallic pipe a #12 copper wire shall also be laid in the trench to aid in future location of the piping. A foil faced warning tape may be used in lieu of the plastic tape and wire.

K. All manholes, vaults, and similar underground structures shall have the top elevation set flush with finished grade unless specifically noted otherwise.

6. MINIMUM DEPTHS OF BURY (TO TOP OF PIPE)

In the absence of other indication, the following shall be the minimum depth of bury of exterior utility lines. (Check drawings for variations).

A. Sanitary Lines (Exterior) .................................................................36 inches.

END OF SECTION 201200
1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

B. When a pipe size is not indicated, the Contractor shall request the pipe size from the Engineers. All piping shall be installed straight and true, parallel or perpendicular to the building construction. Piping shall be installed so as to allow for expansion without damage to the building finishes, structure, pipe, equipment, etc., use offsets, U-bends or expansion joints as required. Where a section of piping is not indicated but is obviously required for completion of the system, the Contractor shall provide same at no additional cost to the project. No mitered joints or field fabricated pipe bends shall be accepted. Pipe shall clear all windows, doors, louvers and other building openings.

C. All pipe shall be supported in a neat and workmanlike manner and wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze type hangers. Vertical risers shall be supported at each floor line with approved steel pipe riser clamps. The use of wire or perforated metal to support pipes will not be permitted. Hanging pipes from other pipes shall not be permitted. Spacing of pipe supports shall not exceed eight feet for pipes up to 1-1/4 inches and ten feet on all other piping. Small vertical pipes (1 inch and less) shall be bracketed to walls, structural members, etc. at four (4) foot intervals so as to prevent vibration or damage by occupants. Insulated piping shall be supported on a rigid insulation block at each hanger so as to prevent crushing of insulation by hangers. Hangers shall pass completely around the insulation jacket and a steel protective saddle shall be applied to prevent compression of the insulation. (Refer to Specifications Section entitled INSULATION-MECHANICAL). In metal buildings, support piping with standard pipe hangers with C-clamp connection to main structural members (not perlins), use angle steel cross pieces between main structural members where required to provide rigid support.

D. Where piping rests directly on a hanger, clip, bracket or other means of support, the support element shall be of the same material as the pipe, (e.g., copper to copper, ferrous to ferrous, etc.) or shall be electrically isolated one from the other so as to prevent pipe damage by electrolysis. Pay particular attention and do not allow copper pipe to rest on ferrous structural members, equipment, etc. without electrolytic isolation.

E. In general, piping shall be installed concealed except in Mechanical, Janitor Rooms, etc. unless otherwise indicated, and shall be installed underground or beneath concrete slabs only where indicated. All lines at ceilings shall be held as high as possible and shall run so as to avoid conflicts with other trades, and to facilitate the Owner's use and maintenance. Location of pipe in interior partitions shall be carefully coordinated with whoever will construct the partitions after the piping is in place. Where exposed risers occur they shall be kept as close to walls as possible.

F. Installation of pipe shall be in such a manner as to provide complete drainage of the system toward the source. Drain valves shall be provided at all drainage points on pipes. Drain valves shall be 1/2" size gate type with 3/4" hose thread end and vacuum breaker. Label each drain valve.
G. All hot and cold water piping shall be kept a sufficient distance apart so as to prevent heat transfer between them. Cold water piping shall also be kept apart from refrigerant hot gas lines.

H. Piping carrying water or other fluids subject to freezing shall not be installed in locations subject to freezing; if in doubt, consult Engineer.

I. Piping for all drainage systems shall be installed to permit flow, trapping, and venting in accord with current codes and sound practice.

J. All cast iron soil pipe and fittings shall be coated inside and out with coal tar varnish.

K. Non-metallic piping shall be installed in strict accordance with the manufacturer's instructions. If no such instructions are available, consult Engineers.

L. Nipples shall be of the same material, composition and weight classification as pipe with which installed.

M. Where piping is not indicated on the plans, but is obviously or apparently required, contact the Engineers prior to submission of a bid proposal.

N. Pay particular attention to conflict of piping with other work. Do not install until conflict is resolved. If necessary, contact Engineers.

O. Piping materials in each system shall, to the extent practicable, be of the same material. Frequent changes of material (for example, from copper to steel) shall be avoided and in no case shall be accomplished without use of insulating unions and permission of the Engineers.

P. Apply approved pipe dope (for service intended) to all male threaded joints. Pay particular attention to dope for fuel gas lines. The dope shall be listed for such use.

Q. High points of closed loop hot water heating systems shall have manual or automatic air vents as indicated or required unless automatic air vents are specifically indicated. Pipe to suitable drainage point.

R. All piping shall be capped or plugged during erection as required to keep clean and debris and moisture free.

S. The entire domestic hot, cold and recirculating hot water piping system shall be sterilized in strict accord with requirements of the Department of Health Codes, Rules and Regulations for the State which the work is being accomplished in.

T. Provide expansion joints where shown on the plans and where required by good practice. Expansion joints shall be guided and anchored in accordance with the recommendations of the Expansion Joint Manufacturer's Association.

U. Where plastic pipe penetrates a fire rated assembly, it shall be replaced with a metal threaded adapter and a metal pipe per code.

V. Foam Core PVC is not permitted

W. Where piping penetrates interior or exterior walls, the wall shall be sealed air tight. Refer to the sleeving, cutting, patching and repairing section of the specifications for additional requirements.
X. Provide thrust blocks on all storm, sanitary, water, steam, hot, chilled, condenser, etc., and any other piping subject to hammering. Thrust blocks shall be provided at all turns.

Y. All piping to hydronic coils shall be full size all the way to the coil connection on the unit. If control valve is smaller than pipe size indicated, transition immediately before and after control valve. Also, if coil connection at unit is a different size than the branch pipe size indicated, provide transition at coil connection to unit. **On 3-way valve applications, the coil bypass pipe shall be full size.**

Z. Provide check valves on individual hot and cold water supplies to each mixing valve (including each sensor style faucet, safety shower, mop sink, etc.) and each showerhead with a diverter valve (including all ADA showers). This requirement shall not be satisfied by mixing valves or fixtures with internal check valves. Independent external check valves are required.

2. **UNIONS AND FLANGES AND WELDED TEES**

A. Screwed unions, soldered unions or bolted flanges shall be provided as required to permit removal of equipment, valves and piping accessories from the piping system. Keep adequate clearances for coil removal, rodding, tube replacement, motor lubrication, filter replacement, etc. Flanged joints shall be assembled with appropriate flanges, gaskets and bolting. Gaskets for steam piping systems shall be flexitalic spiral wound type. The clearance between flange faces shall be such that the connections can be gasketed and bolted tight without imposing undue strain on the piping system.

B. Dielectric insulating unions or couplings shall be used wherever the adjoining materials being connected are of dissimilar metals such as connections between copper and steel pipe.

C. Tee connections for welded pipe shall be made up with welding fittings. Where the size of the side outlet is such that a different connection technique than on the run is required, a weldolet, sockolet, or threadolet type fitting may be used for the branch in place of reducing tees only where the branch is 2/3 the run size or smaller.

3. **SPECIFICATIONS STANDARDS**

All piping and material shall be new, made in the United States and shall conform to the following minimum applicable standards:

A. Steel pipe; ASTM A-120, A-53 Grade A, A-53 Grade B.

B. Copper tube; Type K, L, M; ASTM B88-62; Type DWV ASTM B306-62.

C. Cast iron soil pipe; ASA A-40.1 and CS 188-59.

D. Cast iron drainage fittings; ASA B16.12.

E. Cast iron screwed fittings; ASA B16.4.

F. Welding fittings; ASA B16.9.

G. Cast brass and wrought copper fittings; ASA B16.18.

H. Cast brass drainage fittings; ASA B16.23.
I. Reinforced concrete pipe; ASTM-C-76-64T.

J. Solder; Handy and Harmon, United Wire and Supply; Air Reduction Co. or equivalent.

K. CPVC Plastic pipe; ASTM D2846.

L. PVC plastic pipe; ASTM D1785.

M. ABS plastic pipe; ASTM D1788-73.

N. Cross-linked polyethylene (PEX) pipe; ASTM F876 and ASTM F877.

O. Cross-linked polyethylene (PEX) fittings; ASTM F1960

4. PITCH OF PIPING

All piping systems shall be installed so as to drain to a low point. Certain minimum pitches shall be required for this drainage. For proper flow and/or for proper operation, the following pitches shall be required:

A. Interior Soil, Waste and Vent Piping:

1/4 inch per foot in direction of flow where possible but in no case less than 1/8" per foot.

B. Exterior Sanitary Lines:

Not less than one (1) percent fall in direction of flow and no greater than indicated.

C. Condensate Drain Lines From Cooling Equipment:

Not less than 1/4 inch per foot in direction of flow.

D. High And Low Pressure Steam Mains:

One inch in 20 feet in direction of flow.

E. Steam Condensate Return Lines:

One inch in 20 feet in direction of flow.

F. Exterior Storm Lines:

Not less than 1 percent grade in direction of flow.

G. All Other Lines:

Provide ample pitch to a low point to allow 100 percent drainage of the system.

5. APPLICATIONS

A. General Notes
(1) Where plastic piping penetrates a fire rated assembly, it shall be replaced with a threaded metal adapter and metal pipe or whatever means necessary to maintain the separation rating in accordance with local plumbing and fire codes.

(2) Plastic piping or any materials with a flame and smoke spread rating not approved for plenum use shall not be permitted in supply, return, relief or exhaust plenums.

(3) PVC, CPVC, or plastic piping shall not be used under paving, roads or areas where vehicular traffic is expected.

(4) PVC or plastic piping whether specifically listed or not may not be used in high rise buildings or anywhere else prohibited by code.

B. Sanitary Sewer – Exterior

(1) Service weight cast iron piping with bell and spigot fittings complying with ASTM A 74. All joints shall be compression gasket type.

(2) SDR 35 PVC pipe extruded from Type 1, Grade 1 polyvinyl chloride material. PVC pipe shall have a bell type fitting on one end. All joints shall be solvent cement type, made in accordance with the Kentucky Plumbing Code.

(3) Service weight hubless cast iron with manufacturer’s approved bands.

C. Soil Waste and Vent Piping - General Requirements

(1) Water closet floor flanges and ells shall be cast iron regardless whether PVC piping is allowed or not.

(2) Soil and waste piping serving mechanical rooms, laundries and kitchens shall be cast iron regardless whether PVC piping is allowed or not. Cast iron will also be required at any other location where waste water temperature can exceed 120°F. Cast iron shall extend a minimum of 35’ past last waste inlet.

D. Soil, Waste and Vent Piping (Below Slab)

(1) Schedule 40 PVC pipe with drainage pattern fittings and solvent cement joints made in accordance with the Kentucky Plumbing Code. Foam core piping is not permitted.

(2) Service weight hubless cast iron with manufacturer’s approved bands.

E. Soil, Waste and Vent Piping (Above Slab)

(1) Service weight hubless cast iron pipe with manufacturer’s approved bands.

(2) Service weight cast iron hub and spigot piping with compression gasket joints.

(3) Schedule 40 PVC pipe with drainage pattern fittings and solvent cement joints made in accordance with the Kentucky Plumbing code.

F. Natural Gas Piping – Interior

PIPE, PIPE FITTINGS
BLUEGRASS LEXINGTON AIRPORT
GENERAL AVIATION FACILITY
SCB # 1508
(1) Schedule 40 black steel pipe with malleable iron threaded fittings for pipe sizes 2" and smaller.

NOTES:

(1) All gas piping shall be installed per NFPA 54.

(2) Unions or valves shall not be installed in an air plenum.

(3) Piping below slab must be sleeved and vented.

(4) Piping installed in concealed locations shall not have mechanical joints.

G. Domestic Cold, Hot and Recirculating Hot Water Piping (Above Slab)

(1) Type "L" hard copper tubing with wrought copper fittings with lead free solder equivalent in performance to 95/5. (Maximum lead content of solder and flux is 2%).

H. Refrigerant Piping

Interior Piping for Variable Refrigerant Flow Systems 1/8" to 1-3/8" shall be ACR soft copper tube with long radius bends of soft copper tube. Provide ACR hard copper tube in all sizes for systems other than Variable Refrigerant Flow. Interior lines larger than 1-3/8" shall be ACR hard copper tube. All exterior lines shall be ACR hard copper tube. Fitting shall be wrought or forged copper with silver solder joints and minimum 15% silver content.

(1) General Installation Notes:

a. Contact Engineer 24 hours prior to installation of refrigerant lines or evacuation of refrigerant system.

b. Refrigerant lines installation must meet HVAC equipment manufacturer's recommendations.

c. While installing or soldering refrigerant lines, system must continuously be purged with nitrogen.

d. After system is installed, the refrigerant system must be evacuated to 25 microns for eight hours.

I. Condensate Drain Lines

(1) Type "DWV" copper, wrought copper, lead free solder.

(2) Schedule 40 PVC with solvent welded fittings.

END OF SECTION 201300
1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

B. The Contractor shall provide all valves required to control, maintain and direct flow of all fluid systems indicated or specified. This shall include, but may not be limited to all valves of all types including balancing cocks, air cocks, lubricated plug cocks, packed plug cocks, special valves for special systems, etc., for all Mechanical Systems.

C. All valves shall be designed and rated for the service to which they are applied.

D. The following type valves shall not be acceptable: Zinc, plastic, fiber or non-metallic.

E. Ball valves with temperature and pressure ports are not an acceptable alternative to the balancing valves specified herein. Valves that do not comply with these specifications shall be removed and replaced by the Contractor with no increase in contract price.

F. Each type of valve shall be of one manufacturer, i.e., gate valves, one manufacturer, globe valves, one manufacturer, silent check valves, one manufacturer, etc. The following valve manufacturers shall be acceptable: Lunkenheimer, Tour & Anderssen, Powell, Nibco, Crane, Jenkins, T & S Brass, Walworth, Milwaukee, DeZurik, Consolidated Valve Industries, Inc., Victaulic, Bell & Gossett, Flow Design, Watts.

G. All valves shall comply with current Federal, State and Local Codes.

H. All valves shall be new and of first quality.

I. All valves shall be full line size. Valves and hydronic specialties shall not be reduced to coil or equipment connection size. Size reductions shall be made at the connection to the equipment.

J. Angle stops for plumbing fixtures shall be quarter turn ball type.

K. All valves for use in potable water systems shall comply with federal lead free requirements that the lead content of wetted surfaces cannot exceed 0.25% by weight.

2. LOCATION OF MAINTENANCE VALVES

Maintenance valves and unions, installed so as to isolate equipment from the system shall be installed at the following locations:

A. At each plumbing fixture.

B. At all other locations indicated on the drawings.

3. WORKMANSHIP AND DESIGN
A. Handwheels for valves shall be of a suitable diameter to allow tight closure by hand with the application of reasonable force without additional leverage and without damage to stem, seat and disc. Seating surfaces shall be machined and finished to insure tightness against leakage for service specified and shall seat freely. All screwed valves shall be so designed that when the screwed connection is properly made, no interference with, nor damage to the working parts of the valve shall occur. The same shall be true for sweat valves when solder or brazing is applied.

4. TYPES AND APPLICATION

A. CHECK VALVES

Check Valves shall be horizontal swing type with two piece hinges, disc construction seats to be bronze and bronze discs or with composition face depending on service and provide silent operation. Valves 1-1/2 inches and smaller shall be bronze with ends to suit piping, have full area "Y" pattern body and integral seats. Valves 2 inches and larger shall be iron body brass mounted and with flanged ends. Working pressure for bronze valves shall be 150 psi and iron valves 125 psi when installed in piping with system pressures up to 100 psi and 250 psi for 100 psi and over. 3" and under NIBCO T433Y, greater than 3" NIBCO F918B (for less than 100 psi systems) greater than 3" NIBCO F968B (for 100 psi or greater systems).

B. BALL VALVES (POTABLE WATER)

All valves for use in potable water systems 2" and smaller contain less than 0.25% lead by weight and comply with federal lead free potable water requirements. Ball valves shall have a removable lever handle with vinyl grip, adjustable stem gland screw, reinforced Teflon stuffing boxring, blowout proof stem, stainless steel or bronze body, reinforced Teflon seats, stainless steel or chrome plate steel ball as manufactured by Appollo, Aslo, Nibco, Milwaukee, or equivalent. Provide a stem extension so that they bas of the handle is ¼” above the insulation similar to Nibseal. NIBCO S-585-66-LF.

END OF SECTION 202100
SECTION 202200 - INSULATION - MECHANICAL

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

B. Work under this section shall include all labor, equipment, accessories, materials and services required to furnish and install all insulation, fittings and finishes for all mechanical systems specified herein and/or as indicated.

C. Application of insulation materials shall be done in accordance with manufacturer's written recommendations. Where thickness of insulation is not specified, use applicable thickness recommended by manufacturer for specific use. Insulation shall be applied by a company regularly engaged in the application of insulation and any work deemed unacceptable by the Engineers shall be removed and properly installed at the expense of the Contractor.

2. MANUFACTURERS

A. Insulation shall be as manufactured by Manville, Knauf, CertainTeed, Owens-Corning, Armacell or other approved equivalent. Insulation sundries, adhesives, and jackets/covers shall be as made by Benjamin Foster, Zeston, Speedline, Proto, Childers, Vimasco or approved equivalent.

3. FIRE RATINGS AND STANDARDS

A. Insulations, jackets and facing shall have composite fire and smoke hazard ratings as tested by ASTM E-84, NFPA 255 and UL 723 procedures not exceeding Flame Spread 25, Smoke Developed 50.

B. Adhesives, mastics, tapes and fitting materials shall have component ratings as listed above.

C. All products and their packaging shall bear a label indicating above requirements are not exceeded.

D. Duct linings shall meet the Erosion Test Method in compliance with UL Publication No. 181.

4. GENERAL APPLICATION REQUIREMENTS

A. Insulation shall be applied on clean, dry surfaces in a neat and workmanlike manner reflecting the best current practices in the trade. Insulation shall not be applied to piping, ductwork or equipment until tested, inspected and released for insulation.

B. All insulation shall be continuous through walls, ceiling openings and sleeves. However, insulation shall be broken through fire walls. All covered pipe and ductwork is to be located a sufficient distance from walls, other pipe, ductwork and other obstacles to permit the application of the full thickness of insulation specified. If necessary, extra fittings and pipe are to be used. No noticeable deformation of insulation or discontinuity of vapor seal, where required, will be accepted.

C. "Concealed", where used herein, shall mean hidden from sight as in trenches, chases, furred spaces, pipe shafts, or above hung finished ceilings. "Exposed" shall mean that piping or equipment is not "concealed" as defined above. Piping and equipment in service tunnels,
mechanical equipment rooms, storage areas, or unfinished rooms is to be considered as "exposed".

D. Existing and/or new insulation removed and/or damaged during course of construction shall be repaired or replaced as directed by the Engineer.

E. Vapor barrier jackets shall be applied with a continuous unbroken vapor seal. Do not use staples thru the jacket. NO EXCEPTIONS!

F. All insulation shall be installed with joints butted firmly together.

G. The Contractor shall insure that all insulation (piping, ductwork, equipment, etc.) is completely continuous along all conduits, equipment, connection routes, etc. carrying cold fluids (air, water, other) and that condensation can, in no way, collect in or on the insulation, equipment, conduits, etc. Any such occurrence of condensation collection and/or damage therefrom shall be repaired solely at the expense of the Contractor.

5. PIPING SYSTEMS

A. GENERAL

(1) Bevel insulation and jacket at all points where insulation terminates at unions, flanges, valves and equipment. Note: Applies to hot water lines only; cold water lines require continuous insulation.

(2) Pipe insulation shall extend around valve bodies to above drain pans in hydronic equipment over pumps, etc. to ensure no condensation drip or collection.

(3) Factory molded fittings may be installed in lieu of built-up fittings. Jackets to be the same as adjoining insulation. Insulated fittings must have same or better K factors than adjoining straight run insulation.

(4) Valves, flanges and unions shall only be insulated when installed on piping whose surface temperature will be at or below the dew point temperature of the ambient air.

(5) Insulation shall not extend through fire and smoke walls. A UL-listed penetration system shall be used for each fire or smoke wall penetration in accordance with KBC. Materials used such as caulk, sleeves, etc. shall be manufactured by 3M, Hilti, or equal.

B. INSULATION SHIELDS

(1) Metal insulation shields are required at all pipe hangers where the piping is insulated. Metal shields shall be constructed of galvanized steel, formed to a 180 degree arc. Insulation shields shall be the following size:

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>SHIELD GAUGE</th>
<th>SHIELD LENGTH</th>
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<tbody>
<tr>
<td>2” AND LESS</td>
<td>20</td>
<td>12”</td>
</tr>
<tr>
<td>2 1/2” TO 4”</td>
<td>18</td>
<td>12”</td>
</tr>
<tr>
<td>5” TO 10”</td>
<td>16</td>
<td>18”</td>
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<tr>
<td>12” AND GREATER</td>
<td>14</td>
<td>24”</td>
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</table>
C. INSULATION MATERIAL (FOR THE FOLLOWING SYSTEMS)

Insulation shall be Owens-Corning Model 25ASJ/SSL, or approved equivalent fiberglass pipe insulation with an all service jacket. The insulation shall be a heavy density, pipe insulation with a K factor .23 at 75°F mean temperature. The insulation shall be wrapped with a vapor barrier jacket approved manufacturers are listed in section 2. Manufacturers. The jacket shall have an inside foil surface with self sealing lap and a water vapor permeability of .02 perm/inch. All circumferential joints shall be vapor sealed with butt strips. All insulation shall be installed in strict accordance with the manufacturers’ recommendations. The following pipes shall be insulated with the thickness of insulation as noted.

(1) Domestic Cold Water, Lab High Purity Water
   a. Piping 3” or less – use 1/2” thick insulation.
   b. Piping 4” or greater – use 1” thick insulation.

(2) Domestic 110°F Hot Water and 110°F Recirculating Hot Water. (If heat traced, see below)
   a. Piping 1 ½” or less – use 1 ½” thick insulation.
   b. Piping 2” or greater – use 2” thick insulation.

(3) Refrigerant Liquid and Suction Lines - Interior & Exterior

IMCOA, Nomaco, or Armacell closed cell polyethylene, 1.5 Lbs/Ft³ density, 0.24 BTU-Hr.-Ft³-F/ in at 75°F thermal conductivity, zero vapor permeance, 25/50 flame and smoke spread per NFPA 90 requirements. Elastomeric closed cell insulations that meet the above requirements are also allowed. Install insulation per the manufacturer's requirements. Provide UV protective coating for all exterior refrigerant lines.

   a. All pipe sizes: 1 ½” thick

6. DUCTWORK SYSTEMS

A. GENERAL

(1) Duct sizes indicated are the net free area inside clear dimensions; where ducts are internally lined, overall dimensions shall be increased accordingly.

(2) Duct insulation shall extend completely to all registers, grilles, diffusers, and louver outlets, etc., to insure no condensation drip or collection. The backs of all supply diffusers, plenums, grilles, etc. shall be insulated only if indicated by details on the drawings.

(3) All flexible duct connections on insulated ductwork shall be externally insulated.

B. EXTERNAL INSULATION

(1) Supply Air
(2) Outside Air

Owens/Corning “Faced Duct Wrap - Type 100”, or approved equal, 2” thick fiberglass duct wrap, 1.0 pcf density factory laminated to a reinforced foil kraft vapor barrier facing (FRK) with a 2” stapling flange at one edge. Flame spread 24, smoke developed 50, vapor barrier performance
0.02 perms per inch. K factor shall not exceed .26 at 75°F mean temperature. Minimum R-value of the 2” thick insulation shall be 7.4 out of package and 6.0 installed.

Special Notes:

a. Do not provide externally insulated duct per the above specification for any duct that is to be painted. Insulated duct that is to be painted shall be dual wall ductwork per specification Section 231200, Sheet Metal and Flexible Duct.

b. Where supply, return, and outside air ductwork is routed through an unconditioned attic or any other space outside of the building thermal envelope, the ductwork shall be provided with a minimum of 2 layers of duct wrap for a minimum R value of 11.0. Additionally, this shall apply to exhaust ductwork on entering side of energy recovery type air handling units.

END OF SECTION 202200
SECTION 202500 - HANGERS, CLAMPS, ATTACHMENTS, ETC.

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Provisions - Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

B. Each Contractor's attention is also directed to Section 201300, Pipe, Pipe Fittings and Pipe Support.

C. This section includes, but is not limited to, furnishing and installing dampers, supports, anchors, and accessories for piping, ductwork, equipment, etc. Furnishing and installing shall be by each trade for the completion of their work.

D. Power driven anchors and expansion anchors shall be permitted only when permission is granted in writing by the Architect and Engineer.

2. MATERIALS AND EQUIPMENT

A. Hangers, Clamps, Attachments, Etc.:

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SPECIFICATION</th>
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</thead>
<tbody>
<tr>
<td>1. Pipe Rings</td>
<td>2&quot; pipe and smaller</td>
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<tr>
<td>2. Pipe Clevis</td>
<td>2-1/2&quot; pipe and larger</td>
</tr>
<tr>
<td>3. Pipe Clevis</td>
<td>All</td>
</tr>
<tr>
<td>4. Rise Clamps</td>
<td>All</td>
</tr>
<tr>
<td>5. Beam Clamps and Attachments</td>
<td>All</td>
</tr>
<tr>
<td>6. Brackets</td>
<td>All</td>
</tr>
</tbody>
</table>

- 1. Pipe Rings: Adjustable swivel split ring or split pipe ring, Grinnell Figures 104 and 108, Elcen, Fee & Mason, or approved equivalent.
- 2. Pipe Clevis: Adjustable wrought Clevis type, Grinnell Figure 260, Elcen,Fee & Mason, or approved equivalent.
- 3. Pipe Clevis: Steel Clevis for insulated pipe, Elcen Figure 12A, Grinnell, Fee & Mason or approved equivalent.
- 4. Rise Clamps: Extension pipe or riser clamp, Grinnell Figure 261, Elcen, Fee & Mason or approved equivalent.
- 5. Beam Clamps and Attachments: Grinnell Figure numbers listed or, Elcen, Fee & Mason, or approved equivalent. Malleable beam clamp with extension piece figure 229; I-beam clamp figure 131; C-clamp figures 83, 84, 85, 86, 87, and 88.
- 6. Brackets: Welded steel brackets medium weight, Grinnell Figure 195, Elcen, Fee & Mason or approved equivalent.
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Grade</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Inserts</td>
<td>All</td>
<td>Grinnell Figure numbers listed or, Elcen, Fee &amp; Mason or approved equivalent. Wrought steel insert Figure 280 and wedge type insert Figure 281.</td>
</tr>
<tr>
<td>Concrete Fasteners</td>
<td>All</td>
<td>Self-drilling concrete inserts, Phillips, Grinnell, Elcen or approved equivalent.</td>
</tr>
<tr>
<td>Ceiling</td>
<td>All</td>
<td>Grinnell Figure numbers listed or Elcen, Fee &amp; Mason, or approved equivalent. Pipe hanger flange Figure 153, adjustable swinging hanger flange Figure 155, ceiling flanges Figures 128 and 128R, and adjustable ceiling flange Figure 116.</td>
</tr>
<tr>
<td>Rod Attachments</td>
<td>All</td>
<td>Grinnell Figure numbers listed or Elcen, Fee &amp; Mason, or approved equivalent. Extension piece Figure 157, rod coupling Figure 136, and forged steel turnbuckle Figure 230.</td>
</tr>
<tr>
<td>U-Bolts</td>
<td>All</td>
<td>Standard, U-bolt, Grinnell Figure 137, Elcen, Fee &amp; Mason, or approved equivalent.</td>
</tr>
<tr>
<td>Welded Pipe Saddles</td>
<td>All</td>
<td>Pipe covering protection saddle sized for thickness of insulation, Grinnell Figure 186, Elcen, Fee &amp; Mason or approved equivalent.</td>
</tr>
<tr>
<td>Pipe Roll</td>
<td>All</td>
<td>Adjustable swivel pipe roll, Grinnell Figure 174, Elcen, Fee &amp; Mason, or approved equivalent.</td>
</tr>
<tr>
<td>Protection Saddle</td>
<td>All</td>
<td>18 gauge sheet metal pipe protection saddle, Elcen Figure 219, Fee &amp; Mason, Power Strut, or approved equivalent.</td>
</tr>
<tr>
<td>Hanger Rods</td>
<td>All</td>
<td>Steel, diameter of the hanger threading, ASTM A-107.</td>
</tr>
<tr>
<td>Miscellaneous Steel</td>
<td>All</td>
<td>Steel angles, rods, bars, channels, etc., used in framing for supports and fabricated brackets, anchors, etc., shall conform to ASTM-A-7.</td>
</tr>
</tbody>
</table>
### 3. INSTALLATION

A. Unless otherwise specifically indicated or hereinafter specified in the specifications, all supporting, hanging and anchoring of piping, ductwork, equipment, etc., shall be done by each trade as is necessary for completion of the work and shall be as directed in the following paragraphs:

1. Supporting and hanging shall be done so that excessive load will not be placed on any one hangers so as to allow for proper pitch and expansion of piping. Hangers and supports shall be placed as near as possible to joints, turns and branches.

2. For concrete construction, utilize adjustable concrete inserts for fasteners. Expansion anchors and power driven devices may be used when approved in writing by the Architect/Engineer. Utilize beam clamps for fastening to steel joists and beams and expansion anchors in masonry construction. When piping is run in joists, piping shall be top mounted on trapeze type hangers with each pipe individually clamped to trapeze hanger.

3. Trapeze hangers shall be supported by steel rods of sufficient diameter to support piping from joists or concrete construction. Where desired or required, piping may be double mounted on trapeze hangers. Where conditions permit, trapeze hangers may be surface mounted on exposed joists by means of approved beam clamps, or to concrete construction by means of approved adjustable inserts or expansion anchors.

4. Install all miscellaneous steel other than designed building structural members as required to provide means of securing hangers, supports, etc., where piping does not pass directly below or cross steel joists.

5. Piping shall not be supported by the equipment to which it is connected. Support all piping so as to remove any load or stress from the equipment.

6. Where piping, etc., is run vertically, approved riser clamps, brackets or other means shall be utilized at approximately 10'-0" center to center minimum and an approved adjustable base stand or fitting on concrete support base shall be utilized at the base of the vertical run.

7. Where piping is run along walls, knee braced angle frames or pipe brackets with saddles, clamps, and rollers (where required) mounted on structural brackets fastened to walls or columns shall be used.

8. Support all ceiling hung equipment, with approved vibration isolators.

9. Where copper tubing is specified, hangers shall be of copper clad type when piping is uninsulated.

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**HANGERS**

**BLUEGRASS LEXINGTON AIRPORT**

**GENERAL AVIATION FACILITY**

**SCB # 1508**

**202500-3**
(10) Uninsulated piping hung from above shall be supported with ring and clevis type pipe hangers. Uninsulated piping mounted on trapeze and wall bracket type support shall be held in place with U-bolts. U-bolts shall allow for axial movement in the piping.

(11) All insulated piping shall be supported with clevis type and/or pipe roll hangers. Hangers shall be sized to allow the pipe insulation to pass through the hangers. Install insulation protection saddles at all hanger locations. Welded pipe saddles shall be installed at all hangers on piping 5" and larger. The pipe saddles shall be sized for the thickness of insulation used. Hangers shall fit snugly around outside of insulation saddles.

(12) Under no conditions will perforated band iron or steel wire driven hangers be permitted.

(13) In general, support piping at the following spacing:

a. Steel and copper piping - 5 feet intervals for piping 3/4" and smaller. 6 feet intervals for 1 1/4" and 1" pipe. 8 foot intervals for piping 1 1/2" to 3". 10 foot intervals piping 3 1/2" and larger.

b. Polyethylene piping – 4 foot intervals for piping 2" and smaller. 5 foot intervals for 3” pipe. 6 foot intervals for 4", 6", and 8” pipe. 7 foot intervals for 10” and larger pipe.

c. PVC piping – 4 foot intervals for piping 1 1/2" and smaller. 5 foot intervals for 2 and 2 1/2” piping. 6 foot intervals for 3" pipe and larger.

d. Where the manufacturer of the pipe has more strict guidelines, the manufacturer’s recommendations shall be followed.

END OF SECTION 202500
SECTION 203100 - TESTING, BALANCING, LUBRICATION AND ADJUSTMENTS

1. GENERAL

A. The General Conditions, Instructions to Bidders, Section 200100, and other Contract Documents are a part of this specification and shall be binding on all Mechanical Contractors. It shall be each Contractor's responsibility to apprise himself of all information pertinent to his work prior to submitting his proposal. No adjustments will be made in this Contract which is a result of failure to comply with this requirement.

B. The Engineer, or his authorized representative, shall be notified by the Contractor twenty-four (24) hours in advance of any tests called for in these specifications or required by others. Any leaks or imperfections found shall be corrected and a new tests run to the satisfaction of the Engineer or his authorized representative. Upon completion of a test, a written approval of that part of the work will be given to the Contractor. Only after written approval, signed by the Engineer, shall the Contractor apply insulation or paint or allow his work to be furred-in. This written approval, however, does not relieve the Contractor of the responsibilities for any failure during the guarantee period. The expense of all tests shall be borne by the Contractor, along with all temporary equipment, materials, gauges, etc. required for tests.

2. PLUMBING

A. Piping shall be tested before being insulated or concealed in any manner. Where leaks or defects develop, required corrections shall be made and tests repeated until systems are proven satisfactory.

B. Water piping systems shall be subjected to a hydrostatic test of one hundred fifty pounds. The system shall be proven tight after a twenty-four (24) hour test.

C. The house drain line, interior storm sewers, interior rain water conductors, and all soil, waste and vent piping shall be subjected to a hydrostatic test of not less than a 10-foot head or an air test of not less than 5 lbs. per sq. inch using a mercury column gauge and shall hold for 15 minutes.

D. Exterior sewer lines to the termination point outside the building shall be subject to a ten-foot hydrostatic test or an approved smoke test. These lines shall be subjected to a second test after 2 feet of backfill has been properly installed.

E. After fixtures have been installed, the entire plumbing system, exclusive of the house sewer, shall be subjected to an air pressure test equivalent to one inch water column and proven tight. The Contractor responsible shall furnish and install all of the test tees required, including those for isolating any portion of the system for tests.

F. Thermometers and gauges shall be checked for accuracy. If instruments prove defective, they shall be replaced.

G. The Contractor shall perform all additional tests that may be required by the Kentucky Department of Health or other governing agency.

H. Set temperature control on water heaters and adjust tempering valves as required.

I. Balance the water flow rate of each domestic hot water recirculating pump. Set the flow rate for each balancing valve in the recirculating hot water system. If flow rates are not indicated, contact the engineer for each balance valve GPM.
J. Any leaks or imperfections found shall be corrected and a new test run until satisfactory results are obtained. The cost of repair or restoration of surfaces damaged by leaks in any system shall be borne by the Contractor.

3. HEATING, VENTILATING AND AIR CONDITIONING

A. The test and balance of this system shall be by a contractor who employs only the services of a certified AABC or independent NEBB firm whose sole business is to perform test and balance services. The test and balance contractor shall report all deficiencies to the engineer.

B. The Mechanical Contractor shall test all piping before being insulated or concealed in any manner. Where leaks or defects develop, required corrections shall be made and tests repeated until systems are proven satisfactory. Water piping systems shall be subjected to a hydrostatic test of not less than one hundred pounds and shall be proven tight after a twenty-four (24) hour test.

C. All motors, bearings, etc. shall be checked and lubricated as required during start-up procedures. All automatic, pressure regulating and control valves shall be adjusted. Excessive noise or vibration shall be eliminated. Provide all start-up documents to Designer prior to any test and balance services.

D. System balancing, where required, shall be performed only by persons skilled in this work. The system shall be balanced as often as necessary to obtain desired system operation and results.

E. All fan belts shall be adjusted for proper operation of fans.

F. All deficiencies observed by the Test and Balance Contractor shall be reported immediately to the Engineer and Mechanical Contractor.

G. For the purpose of placing the heating, ventilating and air conditioning system in operation according to design conditions and certifying same, final testing and balancing shall be performed in complete accordance with AABC Standards for Total System Balance, Volume Six (2002), for air and hydronic systems as published by the Associated Air Balance Council. The following systems shall be test and balance:

   1) Balance all supply, return and exhaust air grille to within 10% of design air flow rate.

   2) Balance all exhaust air fans and record inlet static pressure.

I. The Test and Balance agency shall provide lifts, scaffolding, etc. as required to balance devices in areas with high ceilings such as gymnasiums, auditoriums, atriums, cupolas, etc. The Test and Balance agency may coordinate with the General Contractor or Mechanical Contractor to arrange for these items to be provided to access high devices, however, it is emphasized the Contractor is finally responsible for providing the means required to balance all devices.

J. Instruments used for testing and balancing of air and hydronic systems shall have been calibrated within a period of six months prior to balancing. All final test analysis reports shall include a letter of certification listing instrumentation used and last date of calibration.

K. Test and Balance agency is to provide sizing of fan or motor sheaves required for proper balance. The Mechanical Contractor will purchase and install all sheaves and belts as required. This includes new and existing equipment.
L. Four (4) copies of the complete test reports shall be submitted to the Consulting Engineer prior to final acceptance of the project. Preliminary test reports shall be submitted when requested.

M. The Contractor shall provide and coordinate their work in the following manner:

   (1) Provide sufficient time before final completion date so that tests and balancing can be accomplished.

   (2) Provide immediate labor and tools to make corrections when required without undue delay.

N. The Contractor shall put all heating, ventilating and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing.

END OF SECTION 203100
SECTION 220100 - PLUMBING SPECIALTIES

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work specified in this section.

B. The Contractor shall provide all equipment and specialties complete with trim required and connect in a manner conforming to the Kentucky Building Code.

C. The Contractor shall obtain exact centerline rough-in dimensions between partitions, walls, etc. as required for lay-out of his rough-in work. All work shall be roughed-in so that all exposed piping will be straight and true without bends or offsets.

D. Prior to final inspection, test by operation at least twice, all equipment.

E. Prior to final inspection, remove all stick-on labels, dirt, grease, other removable stampings, lettering, etc. from equipment and specialties and thoroughly clean same.

F. All equipment and specialties shall be installed as recommended by the manufacturer in a neat and workmanlike manner. Unacceptable workmanship shall be removed and replaced at the installing Contractor's cost.

G. All pipes, valves, fittings, fixtures, etc. for use in potable water systems 2" and below shall comply with federal lead free requirements that the lead content of wetted surfaces cannot exceed 0.25% by weight.

H. The Contractor shall raise or lower existing floor drains and/or clean outs to be flush with new floor surface.

2. DRAINAGE SPECIALTIES

A. GENERAL

(1) Provide all drainage specialties indicated, specified and/or required to provide complete and acceptable removal of all storm, sanitary, waste, laboratory waste, etc. from the building and into approved receptors.

(2) Drainage specialties shall be on non-electrolytic conduction to the material to which they are connected.

(3) Drainage specialties shall be installed in a manner so as to insure no leakage of toxic or odorous gases or liquids and shall have traps and/or backflow preventers where required. Nor shall they allow backflow into other or existing systems.

B. CLEANOUTS - INTERIOR (CO)

(1) In addition to cleanouts indicated, provide cleanouts in soil and waste piping and storm drainage at the following minimum locations:

   a. At base of each stack.
b. At fifty (50) foot maximum intervals in horizontal lines.
c. At each change of direction of a horizontal line.
d. As required by current KBC.
e. As required to permit rodding of entire system. (If in doubt, contact Engineers.)

(2) Water closets, slop sinks and other fixtures with fixed traps shall not be accepted as cleanouts.

(3) Cleanouts and/or test tees concealed in inaccessible pipe spaces, walls and other locations shall have an eight (8) inch by eight (8) inch (minimum) access panel or cover plates shall be set flush with finished floors and walls and shall be key or screw driver operable.

(4) Access panels for cleanouts shall be of the Zurn, 1460 series or equivalent by Josam or Watts. Where they are not to receive paint, they shall be polished bronze unless otherwise indicated where they are to receive paint or other finishes. They may, at the Contractor's option, be Perma-Coated steel, prepared to receive finish.

(5) Cleanouts and access panels shall be sized so as to permit the entry of a full sized rodding head capable of one hundred percent circumferential coverage of the line served.

(6) Provide a non-hardening mixture of graphite and grease on threads of all screwed cleanouts during installation.

(7) Do not install cleanouts against walls, partitions, etc. where rodding will be difficult or impossible. Extend past the obstruction.

(8) In finished walls, floors, etc., insure that cleanouts are installed flush with finished surfaces and, where required, grout or otherwise finish in a neat and workmanlike manner.

(9) Cleanouts shall be as manufactured by Zurn, Josam, Jay R. Smith, Watts, MIFAB, Ancon or equivalent, similar to the following:

a. Zurn, Z-1440 cleanouts or Z-1445 cleanout tee at base of exposed stack and at change in direction of exposed lines.

b. Zurn, Z-1440 cleanout or Z-1445-1 cleanout tee where stacks are concealed in finished walls

c. Zurn, ZN-1400-T cleanout with square scoriated top in finished concrete and masonry tile floors.

d. Zurn, ZN-1400-Tx cleanout with square recessed top for tile in vinyl and linoleum finished floors.

e. Zurn, ZN-1400-Z cleanout with round recessed top for terrazzo floors.

f. Zurn, Z-1400-HD cleanout with tractor cover for exterior locations. Provide concrete supporting pad crowned to shed water. Refer to drawings for pad size.

g. Mueller, No. D-731 or D-714, Nibco, Flage or equivalent for cleanouts in copper waste with cover plates and/or access panels listed for other cleanouts.

h. Threaded hex head type cleanouts of same materials as pipe for piping 2" and smaller.
i. Zurn, cleanout with round top with adjustable retainer for carpet area. Install flush with carpet.

C. CLEANOUTS (EXTERIOR) (ECO)

Provide exterior cleanouts at each location indicated and in the manner indicated. Permanently set all exterior cleanouts centered in a 30” X 30” X 6” deep concrete pad. The top of the concrete pad shall be flush with finished grade. The top of the cleanout box shall be flush with the top of the pad and shall be stamped "CO."

3. GENERAL SPECIALTIES

A. ROOF FLASHINGS

All plumbing vents or other plumbing passing thru the roof shall be flashed as approved by the KBC and as recommended by the roofing manufacturer and/or Contractor.

END OF SECTION 220100
SECTION 220200 - PLUMBING FIXTURES, FITTINGS AND TRIM

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

   B. The Contractor shall provide all fixtures complete with trim required and connect in a manner conforming to the State Plumbing Code.

   C. The Contractor shall obtain exact centerline rough-in dimensions between partitions, walls, etc. as required for lay-out of his rough-in work. All work shall be roughed-in so that all exposed piping will be straight and true without bends or offsets.

   D. All exposed piping or in casework below sinks, stops, traps, tailpieces, etc., shall be code approved chrome plated brass unless otherwise indicated or specified. Water supplies shall connect through walls with stops and chrome plated escutcheons with set screws.

   E. All fittings, fixtures and trim shall be new unless otherwise indicated or specified. They shall also be of equivalent quality, dimensions, material, etc. as those specified. All faucets, shower heads, drains, levers, trim, etc. shall be constructed of metal and not plastic.

   F. Handicapped fixtures shall be mounted as recommended by the KBC and ADA.

   G. All fixtures shall be mounted as recommended by the manufacturer. Fixtures shall be rigidly mounted to walls and floors. Pay particular attention to flush valves and bracket concealed portion to building structure during rough-in. Loose, shaky flush valves, lavatories, etc. shall not be acceptable.

   H. Prior to final inspection open all faucets and allow to run for fifteen (15) minutes, then remove all faucet aerators and thoroughly clean until smooth flow is obtained.

   I. Prior to final inspection, test by operation at least twice:

      (1) (Where applicable) adequate flow of hot and/or cold water at;

      a. All Faucets
      b. Flush Valves
      c. Hose Bibbs
      d. All Other Valved Hot and/or Cold Water Openings In the Plumbing System

      (2) All toilet seats

      (3) All flush tank overflows

   J. Prior to final inspection, remove all stick-on labels, dirt, grease, other removable stampings, lettering, etc. from plumbing fixtures and thoroughly clean same.

   K. All sink and lavatory traps shall have screw in plugs in the bottom for ease of cleaning and have mechanical fittings for ease of removal.
L. All fixtures shall be set level and true and shall be grouted into finished walls, floors, etc. in a neat and workmanlike manner with an approved waterproof non-yellowing grout for such service.

M. Special Note for Handicap Grab Rails: Coordinate top of shower valves, flush valves, flush tank, etc., with location of grab rails as shown on the architectural plans. The Contractor shall install all items to allow for installation, removal and service without removal of the grab bar.

N. All exposed drain pipes and domestic water piping under handicap accessible sinks and lavatories shall be insulated in accordance with ADA requirements and shall have a vinyl plastic covering over all insulation.

O. The Contractor shall obtain a copy of the casework shop drawings and confirm sinks, faucets, gas turrets, etc., will fit in the space provided. Additionally, in ADA applications with handicap sink base cabinets, the Contractor shall limit the total distance from the bottom of the sink to the bottom of the P-trap and coordinate waste pipe rough-in height to ensure the proper installation of the handicap sink base cabinet front closure panel. The Contractor shall not order sinks until he confirms no conflicts occur and shall adjust sink sizes if required. If the Contractor orders sinks, faucets, etc., that do not fit in the casework supplied, he shall replace them at no additional cost.

P. All lavatories, sinks, etc. shall be supplied with center rear drain outlets where necessary to avoid conflict with casework, handicapped kneeboards, etc. If the Contractor orders sinks that do not fit in the casework supplied, he shall replace them at no additional cost.

Q. All single supply faucets shall be provided with mechanical mixing valves unless otherwise noted. Mechanical mixing valves shall have hot and cold water inlet connections, common outlet, in-line check valves, and adjustable temperature setting. Mixing valves shall be Moen model 104424 or equal. Provide one mixing valve per single supply faucet unless otherwise noted. Contractor shall provide all required connections and set mixing valve to required temperature.

R. All gooseneck faucets shall have rigid spouts, unless swing spouts are specified. If swing spouts are specified, the spout shall have a maximum swing of 140 degrees from side to side.

S. All plumbing fixtures shall comply with federal lead free requirements that the lead content of wetted surfaces cannot exceed 0.25% by weight.

T. All water closet handles on ADA water closets shall be located on the approach side of the fixture.

2. FIXTURES AND TRIM

Available Manufacturers: Subject to compliance with requirements of manufacturers offering plumbing fixtures and trim. Plumbing fixtures and trim, which may be incorporated in the work include, but are not limited to, the following:

A. Plumbing Fixtures - Water Closet, Lavatory

   American Standard, U.S. Plumbing Products
   Eljer Plumbingware Div., Wallace-Murray Corp.
   Kohler Co.
   Crane Plumbing
   Universal-Rundle
   Toto
   Zurn Co.
   Sloan Fixtures
B. Plumbing Trim

American Standard, U.S. Plumbing Products
Chicago Faucet Co.
Kohler Co.
Delta Co.
T&S Brass & Bronze Work Co. (Commercial )
Zurn Co.
Just Co.
Speakman Co.
Moen Commercial

C. Flush Valves

Delany Co.
Sloan Valve Co.
Zurn Co.
American Standard

D. Fixture Seats

Bemis Mfg. Co.
Church Seat Co.
Olsonite Corp., Olsonite Seats

E. Water Coolers

Elkay Mfg. Co.
Halsey Taylor Div., King-SealeyThermos Co.
Oasis Co.

F. Stainless Steel Sink

Elkay Mfg. Co.
Just Mfg. Co.
Moen, Div. of Stanadyne/Western
Sterling Co.

G. Fixture Carriers

Josam Mfg. Co.
Jay R. Smith
Tyler Pipe
Zurn Industries
Watts

3. FIXTURE SELECTION

A. Refer to drawings for fixture schedule.
SECTION 230200 - HVAC EQUIPMENT AND HYDRONIC SPECIALTIES

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

B. The Contractor shall provide in complete working order the following heating, ventilation and air conditioning equipment located as indicated and installed, connected and placed in operation in strict accordance with the manufacturer's recommendations. All equipment shall be factory painted and, where applicable, factory insulated and shall, where such standards exist, bear the label of the Underwriters Laboratory.

C. Each subcontractor shall be responsible for their own completion of System Verification Checklists/Manufacturer's Checklist.

D. Factory startup is required for all HVAC equipment. In general, as part of the verification process, equipment suppliers shall perform start-up by their factory authorized technicians and shall complete and submit start-up reports/checklists. This shall include air handling units, boilers, chillers, cooling towers, VFDs, etc.

E. All HVAC equipment shall comply with the latest provisions of ASHRAE Standard 90 and/or International Energy Conservation Code 2012, whichever is more stringent.

F. Installation of all heating, ventilating and air conditioning systems shall be performed by a master HVAC contractor licensed in the state the work will be performed.

G. Note to Suppliers and Manufacturers Representative furnishing proposals for equipment for the project:

   (1) Review the Controls Section of these Specifications (if applicable) to determine controls to be furnished by the equipment manufacturer, if any. The Contractor shall provide all controls with equipment unless specifically listed otherwise.

   (2) Review the section of these specifications entitle: SHOP DRAWINGS, DESCRIPTIVE LITERATURE, MAINTENANCE MANUALS, PARTS LISTS, SPECIAL KEYS, TOOLS, ETC., and provide all documents called for therein.

   (3) Insure that the equipment which you propose to furnish may be installed, connected, placed in operation and easily maintained at the location and in the space allocated for it.

   (4) Determine from the Bid Documents the date of completion of this project and insure that equipment delivery schedules can be met so as to allow this completion date to be met.

   (5) Where manufacturers' temperature controls are specified, they shall be in full compliance with International Mechanical Code Section 606 including automatic smoke shut down provisions.

   (6) Provide factory start-up on site by a factory representative (not a third party contractor) for all HVAC equipment, heat pumps, rooftop units, etc. Submit factory start-up reports to the Engineer.
(7) Provide training to the Owner by a factory representative for each type of equipment. Training shall be a minimum of two (2) hours on site and the Engineer shall be notified one (1) week in advance of the training. Training shall only occur when the systems are complete and 100% functional. All training shall be video taped.

(8) Type 1 kitchen exhaust hoods shall be provided with a heat sensor per IMC 2006, section 507.2.1.1, to enable the exhaust and make-up air system automatically upon detection of heat.

(9) Equipment incorporating energy recovery wheels shall be provided with an aluminum wheel with molecular sieve desiccant, 4 angstrom maximum sieve size. Wheels shall be certified in accordance with ASHRAE 84 or ARI 1060 standards.

(10) All condensate producing equipment shall be provided with a condensate trap as recommended by the equipment manufacturer and a condensate overflow switch.

(11) Provide low ambient and all required controls and accessories on all HVAC equipment to ensure they can provide cooling during the winter season.

(12) Provide a complete air tight enclosure with opening door that seals air tight for all filters on air moving equipment.

(13) All equipment shall be furnished for a single point electrical connection unless specifically excluded as a requirement.

2. EQUIPMENT

A. VENTILATING FANS

(1) Ventilating fans shall be of the type, capacity, size, etc. here-in-after scheduled. Catalog numbers are listed as design criteria only. Alternate selections will be accepted provided quality, function, etc. are equivalent. All fans shall be UL listed, complete with all required disconnects and starters and shall be AMCA rated and certified. Model numbers listed are Greenheck, acceptable alternates are Penn, Carnes, Acme, Shipman, Jenn-Aire and Loren-Cook. The Architect shall select the color for all exposed fans.

(2) Selection

Refer to the schedule on the plans.

END OF SECTION 230200
SECTION 231100 - REGISTERS, GRILLES, AND DIFFUSERS

1. REGISTERS, GRILLES AND DIFFUSERS

   A. GENERAL

   Alternate R, G & D selections, other than manufacturers and models listed below, will be
   accepted, provided quality, function and characteristics are equivalent. Acceptable alternates are
   Price, Titus, Metalaire, Carnes, Anemostat, Kruegar, and Tuttle & Bailey. Shop drawings shall
   identify and list all characteristics of each device exactly as scheduled herein. Finishes shall be
   selected by the Architect. If Architect elects not to select color, all colors shall be off-white.
   Factory color samples shall be submitted with shop drawings.

   B. SELECTION

   Refer to the Selections Scheduled on the Drawings.

END OF SECTION 231100
1. GENERAL

A. The Contractor’s attention is directed to the General and Special Conditions, General Requirements-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

B. This branch of the work includes all materials, labor and accessories for the fabrication and installation of all sheet metal work as shown on the drawings and/or as specified herein. Where construction methods for various items are not indicated on the drawings or specified herein, all such work shall be fabricated and installed in accordance with the recommended methods outlined in the latest edition of SMACNA’s HVAC Duct Construction Standards, Metal and Flexible, and its subsequent addenda. HVAC duct systems shall be fabricated and installed in accordance with the SMACNA duct construction standards (SMACNA-HVAC and SMACNA-Seismic) including Appendix B of the Seismic Restraint Manual Guidelines for Mechanical Systems. These references and plate numbers shall be used by the Engineer for required sheet metal thicknesses and final acceptance of methods of fabrication, hanging, accessories, etc. All equipment furnished by manufacturers shall be installed in strict accord with their recommended methods.

C. Ductwork shall be constructed and installed per the latest edition of the International Mechanical Code.

D. Ductwork shall be kept clean at all times. Ductwork stored on the job site shall be placed a minimum of 4” above the floor and shall be completely covered in plastic. Installed ductwork shall be protected with plastic to prohibit dust and dirt from entering the installed ductwork, air handling unit, terminal devices, etc. Provide temporary filters on all return grilles and duct openings if the units are running prior to the building being satisfactorily cleaned. Do not install the ductwork if the building is not “dried-in”. If this is required, the open ends of duct shall be covered in plastic to protect. The Owner/Engineer shall periodically inspect that these procedures are followed. If deemed unacceptable, the Contractor shall be required to clean the duct system utilizing a NADCA certified Contractor.

Prior to purchase and fabrication of ductwork (shop fabricated or manufactured), the Contractor shall coordinate installations with new and existing conditions. Notify the Engineer if there are any discrepancies for resolution.

E. Provide a SMACNA duct cleanliness level “C” per the latest SMACNA standards. [Refer to LEED / Healthcare Requirements]

F. If separate filter grilles are specified for an HVAC unit the Contractors shall remove any unit mounted filters and blank off the unused filter access opening with sheet metal and seal air tight.

G. Wall Penetrations: Where ducts penetrate interior or exterior walls, the walls shall be sealed air tight. Refer to the sleeving, cutting, patching, and repairing section of the specifications for additional requirements.

H. Duct dimensions indicated are required inside clear dimensions. Plan duct layouts for adequate insulation and fitting clearance.

2. LOW PRESSURE DUCTWORK
A. General (Low Pressure)

(1) Double turning vanes shall be installed in all square turns and in any other locations indicated.

(2) Provide a “high efficiency” type take-off with round damper (Flexmaster STOD-B03 or approved equal) for all round duct branches from a rectangular main to a GRD. Refer to the detail on the drawings for all installation requirements.

(3) Cross-break all ducts where any duct section dimension or length is 18” or larger.

(4) Air volume dampers shall be installed in each duct branch takeoffs and/or where indicated, whichever is more stringent. All such dampers shall be accessible without damage to finishes or insulation and shall be provided where required for proper system balance.

(5) Splitter dampers shall be provided in all rectangular supply air duct tees. Damper blade operator shall extend a minimum two inches thru the insulation.

(6) Unless otherwise dimensioned on the drawings, all diffusers, registers and grilles shall be located aesthetically and symmetrically with respect to lighting, ceiling patterns, doors, masonry bond, etc. Locate all supply, return and exhaust diffusers and grilles in the locations shown on the architectural reflected ceiling plan.

(7) Ducts shall be hung by angles, rods, 18 ga. minimum straps, trapezes, etc., in accordance with SMACNA’s recommended practices. Duct supports shall not exceed 12 ft intervals. There shall be no less than one set of hangers for each section of ductwork. Where ductwork contains filter sections, coils, fans or other equipment or items, such equipment or items shall be hung independently of ductwork with rods or angles. Do not suspend ducts from perlins or other weak structural members where no additional weight may be applied. If in doubt, consult the structural engineer.

(8) Provide approved flexible connectors at inlet and outlet of each item of heating and cooling equipment whether indicated or not. Install so as to facilitate removal of equipment as well as for vibration and noise control.

(9) All ductwork connections, fittings, joints, etc., including longitudinal and transverse joints, seams and connections shall be sealed. Seal with medium pressure, smooth-textured, water based duct sealant. Sealant shall be UL 181B-M listed, UL 723 classified, NFPA 90A & 90B compliant, permanently flexible, nonflammable, and rated to 15”wg. Apply per manufacturer’s recommendations. Contractors shall insure no exposed sharp edges or burrs on ductwork.

(10) All angular turns shall be made with the radius of the center line of the duct equivalent to 1.5 times the width of the duct.

(11) Miscellaneous accessories such as test openings with covers, latches, hardware, locking devices, etc., shall be installed as recommended by SMACNA and/or as indicated. Test openings shall be placed at the inlet and discharge of all centrifugal fans, coils, VAV boxes, fan sections of air handling units, at the end and middle of all main trunk ducts and where indicated. All such openings shall be readily accessible without damage to finishes.

(12) Whether indicated or not, provide code approved, full sized fire dampers at all locations where ductwork penetrates fire rated walls. Fire stop rating shall meet or exceed the rating of the wall. Provide an approved access panel at each fire damper located and sized so as to allow hand reset of each fire dampers. All such fire dampers and access panels shall be readily
accessible without damage to finishes. Refer to Architectural Plans for locations of fire rated walls. All access doors shall be 16"x16" or as high as ductwork permits and 16" in length.

(13) The Contractor who installs the sheet metal shall furnish to the Air Balancing Contractor, a qualified person to assist in testing and balancing the system.

(14) All fans and other vibrating equipment shall be suspended by independent vibration isolators.

(15) The interior surface of the ductwork connecting to return/exhaust air grilles shall be painted flat black. The ductwork shall be painted a minimum of 24" starting from the grille.

B. Materials (Low Pressure Single Wall)

(1) Ductwork, plenums and other appurtenances shall be constructed of the following:


   b. Exposed ductwork in finished spaces requiring insulation such as gymnasiums, etc., shall be dual wall ductwork.

(2) Ductwork, plenums and other appurtenances shall be constructed of the materials of the minimum weights or gauges as required by the latest SMACNA 2" W.G. Standard or the below table, whichever is more stringent. When gauge thickness differs, the heavier gauge shall be selected. The below table shall serve as a minimum:

<table>
<thead>
<tr>
<th>DIA., INCHES</th>
<th>ROUND DUCT</th>
<th>RECTANGULAR DUCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIA., INCHES</td>
<td>GAUGE</td>
<td>WIDTH, INCHES</td>
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<tr>
<td>3 TO 12</td>
<td>26</td>
<td>UP TO 12</td>
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<td>12 TO 18</td>
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<td>13 TO 30</td>
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<td>29 TO 36</td>
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<td>55 TO 84</td>
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<td>37 TO 52</td>
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<td>85 AND ABOVE</td>
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C. Miscellaneous (Low Pressure)

(1) Insulated Flexible Duct (Use Only Where Indicated)

   a. Owens/Corning or equivalent, 1 ½" inch thick fiberglass insulation; flexible liner; with aluminum pigment vinyl vapor barrier facing. Insulated flexible duct shall meet Fire Hazards Standards of NFPA 90A and IMC, flame spread not to exceed 25, smoke develop and fuel contributed not to exceed 50 when tested in accordance with ASTM-E84. Minimum R-value of 6.0, tested in accordance with ASTM C177.71. Flexible duct may be used only for runouts and no sections shall be more than five feet in length.
b. When flexible duct is located in areas where it will be visible because the ceiling allows views to the ductwork above, the flexible duct shall be black. The black color shall be factory coloring and not field applied.

c. Flexible duct shall not be used in areas where there is no ceiling.

d. Flexible ductwork installed in a return or exhaust or other negative static pressure application shall be rated for installation in negative pressure systems.

e. Flexible duct shall be rated for 10 inches W.G. static pressure.

f. A single length of flexible duct shall not exceed 4’0”.

g. The minimum bend radius shall be 1 ½ times the duct diameter. The radius shall be measured to the inside edge of the flexible duct.

h. Total offset in any run of flexible duct shall not exceed 90 degrees.

i. Provide a minimum of one hanger of each run of flexible duct. The hanger must be strapped around the flexible duct and secured to the structure above. Hangers shall not be attached to other mechanical or electrical objects. Hangers may be attached to an approved trapeze. Ceiling grid shall not be used to fabricate a trapeze. Support hangers shall be installed horizontal. Screws shall not be used to penetrate the flexible duct to attach the hanger.

j. Flexible duct shall be secured to the rigid duct and appliance with a nylon adjustable, self-locking, strap and a minimum of three sheet metal screws. The flexible duct shall be sealed airtight at each connection with self-adhesive aluminum tape. Fiber or cloth duct tape is not permitted to seal rigid or flexible duct.

k. All flexible duct shall be pressure tested by a testing and balancing agency to ensure the installation is airtight.

(2) Flexible Connectors: Duro-Dyne, Ventfabrics, Inc., U.S. Rubber or equivalent; conforming to NFPA Pamphlet No. 90-A; neoprene coated glass fabric; 20 oz. for low pressure ducts secured with snap lock.

(3) Turning Vanes: Duro-Dyne or equivalent fabricated as recommended by SMACNA: noiseless when in place without mounting projections in ducts. All turning vanes shall be double blade type.

(4) Splitter Damper: Splitter damper shall be constructed of 16 gauge galvanized steel. Provide with operating hardware by Ventfabrics, Inc. to include damper blade bracket, ball joint bracket and operator shaft. Operator shall extend two inches from duct to allow for external insulation, where required. Regulator shall seal operator shaft air tight. Install hardware as recommended by manufacturer.

(5) Access Doors; In Ductwork: Flexmaster TBSM, Air Balance, Vent Products or equal. Access doors for rectangular ducts shall be 16”x16” where possible. Otherwise install as large an access door as height permits by 16” in length. Door shall be 1” thick double-wall insulated with continuous hinge and cam lock. Provide in ducts where indicated or where required for servicing equipment whether indicated or not. Provide a hinged access door in
duct adjacent to all fire, smoke and control dampers for the purpose of determining position. Access doors shall also be provided on each side of duct coils (water, electric, steam, etc.) and downstream side of VAV boxes and CAV boxes.

(6) Architectural Access Doors In Ceilings or Walls: Provide where required to access equipment, dampers, valves, filters, etc. Provide Kees D Panel, Cesco, Milcor or equal. Panels shall be 24"x24" in size and constructed with 16 gauge galvannealed steel for door and frame. In finished areas, provide with primed steel with 1” border to accept architectural specified finish. In Mechanical, Electrical, or service spaces, provide brushed satin finish with 1” border. Door shall include three (3) screwdriver operated cam latches and concealed continuous pivoting rod hinge. Door shall open 175 degrees. For masonry construction, furnish frames with adjustable metal masonry anchors. For fire rated units, provide manufacturer’s standard insulated flush panel/doors with continuous piano hinge and self-closing mechanism. The Contractor shall include all required access doors in the bid and shall coordinate with the General Contractor prior to the bid to insure a complete project.

(7) Volume Dampers (Rectangular): Ruskin, Model MD35 or Empco, Air Balance; Louvers and Dampers, Titus, Carnes, Cesco/Advanced Air, Creative Metals, United Air, Pottorff rectangular volume dampers. Frames shall be 4" x 1 "x 16 gauge galvanized steel. Blades shall be opposed blade 16 gauge galvanized steel with triple crimped blades on 6" centers. Linkage shall be concealed in jamb. Bearings shall be 1/2” nylon. Maximum single section size shall be 48” wide and 72” high. Provide with Ventfabrics 2” high elevated dial regulator to avoid damper handle from conflicting with duct insulation. Provide permanent mark on dial regulator to mark air balance point.

(8) Volume Dampers (Round): Ruskin, Model MDRS25 or, Empco, Air Balance; Louvers and Dampers, Titus, Carnes, Cesco/Advanced Air, Creative Metals, United Air, Pottorff round volume dampers. Dampers shall be butterfly type consisting of circular blade mounted to axle. Frames shall be 20 gauge steel, 6” long. Damper blades shall be 20 gauge galvanized steel. Axle shall be 3/8"x6" square plated steel. Bearing shall be 3/8” nylon. Provide with Ventfabrics 2” high elevated dial regulator to avoid damper handle from conflicting with duct insulation. Provide permanent mark on dial regulator to mark air balance point.

END OF SECTION 231200
1. GENERAL

A. The Instructions to Bidders, General and Special Conditions, and all other contract documents shall apply to the Contractor’s work as well as to each of his Sub Contractor’s work. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.

B. The Contractor shall be governed by any alternates, unit prices and Addenda or other contract documents insofar as they may affect his part of the work.

C. The work included in this division consists of the furnishing of all labor, equipment, transportation, supplies, material and appurtenances and performing all operations necessary for the satisfactory installation of complete and operating electrical systems indicated on the drawings and/or specified herein.

D. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the electrical systems in a substantial manner, in compliance with the requirements stated, implied, or intended in the drawings and specifications, shall be included as part of this Contract. The Contractor shall give written notice of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted a minimum of ten days prior to bid. In the absence of such written notice and by the act of submitting his bid, it shall be understood that the Contractor has included the cost of all required items in his bid, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensations.

E. It is not the intent of this section of the specifications (or the remainder of the contract documents) to make any specific Contractor, other than the Contractor holding the prime contract, responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be done through the Contractor to the Architect (if applicable), then to the Engineer.

F. This section of the Specifications or the arrangement of the contract documents shall not be construed as an attempt to arbitrarily assign responsibility for work, material, equipment or services to a particular trade Contractor or Sub-Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be the responsibility of the Contractor holding the prime contract.

G. It is the intent of this Contract to deliver to the Owner a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be responsibility of the Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials to be installed by other trades without additional cost to the Owner.

H. The Contractor shall provide interim life safety and fire detection measures as required by the Authority Having Jurisdiction, Division 1 specifications, NFPA, and applicable Codes. This includes temporary relocations of heat/smoke detection, exit signage, and egress lighting in existing buildings as applicable.
I. In general, and to the extent possible, all work shall be accomplished without interruption of the existing facilities' operations. Each Contractor shall advise the Architect, Owner and Engineer (as applicable) in writing at least one week prior to the deliberate interruption of any services. The Owner shall be advised of the exact time that interruption will occur and the length of time the interruption will occur. Failure to comply with this requirement may result in complete work stoppage by the Contractors involved until a complete schedule of interruptions can be developed.

J. Whenever utilities are interrupted, either deliberately or accidentally, the Contractor shall work continuously to restore said service. The Contractor shall provide tools, materials, skilled journeymen of his own and other trades as necessary, premium time as needed and coordination with all applicable utilities, including payment of utility company charges (if any), all without request for extra compensation to the Owner, except where otherwise provided for in the contract document.

K. Definitions:

(1) Prime Contractor - The Contractor who has been engaged by the Owner in a contractual relationship to accomplish the work.

(2) Electrical Contractor - Any Contractor whether bidding or working independently or under the supervision of a General Contractor, that is: the one holding the Prime Contract and who installs any type of Electrical work, such as: power, lighting, television, telecommunications, data, fiber optic, intercom, fire detection and alarm, security, video, underground or overhead electrical, etc.

Note: Any reference within these specifications to a specific entity, i.e., "Electrical Contractor" is not to be construed as an attempt to limit or define the scope of work for that entity or assign work to a specific trade or contracting entity. Such assignments of responsibility are the responsibility of the Contractor or Construction Manager holding the prime contract, unless otherwise provided herein.

(3) Electrical Sub-Contractor - Each or any Contractor contracted to, or employed by, the Electrical Contractor for any work required by the Electrical Contractor.

(4) Engineer - The Consulting Mechanical-Electrical Engineers, either consulting to the Owner, Architect, other Engineers, etc.

(5) Architect - The Architect of Record for the project, if any.

(6) Furnish - Deliver to the site in good condition.

(7) Provide - Furnish and install in complete working order.

(8) Install - Install equipment furnished by others in complete working order.

(9) Contract Documents - All documents pertinent to the quality and quantity of all work to be performed on the project. Includes, but not limited to: Plans, Specifications, Addenda, Instructions to Bidders, (both General and Sub-Contractors), Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Construction Manager's Assignments, Architect's Supplemental Instructions, Periodical Payment Requests, etc.

2. INTENT
A. It is the intent of these specifications and all associated drawings that the Contractor provide finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

B. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

3. ELECTRICAL DRAWINGS AND SPECIFICATIONS

A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed insofar as possible. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted in writing to the Engineer for review before proceeding with the work. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Contractors shall, however, anticipate that additional offsets may be required and submit their bid accordingly.

B. The drawings and specifications are intended to supplement each other. No Contractor or supplier shall take advantage of conflict between them, or between parts of either, but should this condition exist, the Contractor or supplier shall request a clarification of the condition at least ten days prior to the submission of bids so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be the determining factor. In all instances, unless modified in writing and agreed upon by all parties thereto, the Contract to accomplish the work shall be binding on the affected Contractor.

C. The drawings and specifications shall be considered to be cooperative and complimentary and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.

D. The Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.

E. The Engineer shall reserve the right to make minor adjustments in location of conduit, fixtures, outlets, switches, etc., where he considers such adjustments desirable in the interest of concealing work or presenting a better appearance.

F. The Contractor shall evaluate ceiling heights called for on Architectural Plans. Where the location of Electrical equipment may interfere with ceiling heights, the Contractor shall call this to the attention of the Engineer in writing prior to making the installation. Any such changes shall be anticipated and requested sufficiently in advance so as to not cause extra work on the part of the Contractor or unduly delay the work.

G. Special Note: Always check ceiling heights indicated on Drawings and Schedules and insure that these heights may be maintained after all mechanical and electrical equipment is installed. If a conflict is apparent, notify the Engineer in writing for instructions.

H. Should overlap of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.
I. The drawings are intended to show the approximate location of equipment, materials, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions whether given in figures or scaled shall be verified in the field. In case of conflict between small and large scale drawings, the larger scale drawings shall take precedence.

J. The Contractor and his Sub Contractors shall review all drawings in detail as they may relate to his work (structural, architectural, site survey, mechanical, etc.). Review all drawings for general coordination of work, responsibilities, ceiling clearances, wall penetration points, chase access, fixture elevations, etc. Make any pertinent coordination or apparent conflict comments to the Engineers at least ten days prior to bids, for issuance of clarification by written addendum.

K. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.

4. EXAMINATION OF SITE AND CONDITIONS

A. The Contractor shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. All Contractors or suppliers shall carefully examine all Drawings and Specifications and contract documents to determine the kind and type of materials to be used throughout the project and which may, in any way, affect the execution of his work.

B. The Contractor shall fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of temporary or permanent utilities, etc. The Contractor shall include in his work all expenses or disbursements in connection with such matters and conditions. The Contractor shall verify all work shown on the drawings and conditions at the site, and shall report in writing to the Engineer ten days prior to bid, any apparent omissions or discrepancies in order that clarifications may be issued by written addendum. No allowance is to be made for lack of knowledge concerning such conditions after bids are accepted.

5. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

A. When any Contractor requests review of substitute materials and/or equipment, and when under an approved formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without additional cost regardless of changes in connections, spacing, service, mounting, etc. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall advise all such Contractors of the change and shall reimburse them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Special Note: Review of Shop Drawings by the Engineer does not absolve the Contractor of this responsibility

B. References in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Each Contractor, in such cases, may, at his option, use any article, device, product, material, fixture, form, or type of construction which in the judgment of the Engineer is equivalent to that specified, provided the provisions of paragraph (A) immediately preceding are met. Substitutions shall be submitted to the Engineer a minimum
of ten days prior to bid date for approval to bid in written form thru addenda or other method selected by the Engineer. If prevailing laws of cities, towns, states or countries are more stringent than these specifications regarding such substitutions, then those laws shall prevail over these requirements.

C. Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the engineers.

D. The Contractor shall furnish along with his proposal a list of specified equipment and materials which he proposes to provide. Where several makes are mentioned in the Specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall have the right to choose any of the makes mentioned without change in price.

E. The Contractor shall review the contract documents and if a material substitution form is required for each proposed substitution, it shall be submitted per requirements.

6. SUPERVISION OF WORK

A. Each Contractor and Sub-Contractors shall personally supervise the work or have a competent superintendent on the project site at all times during progress of the work, with full authority to act for him in matters related to the project.

7. CODES, RULES, PERMITS, FEES, REGULATIONS, ETC.

A. The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, and other costs including utility connections or extensions, in connection with his work. As necessary, he shall file all required plans, utility easement requests and drawings, survey information on line locations, load calculations, etc., prepare all documents and obtain all necessary approvals of all utility and governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Engineer before request for acceptance and final payment for the work.

B. Ignorance of Codes, Rules, regulations, utility company requirements, laws, etc., shall not diminish or absolve Contractor's responsibilities to provide and complete all work in compliance with such.

C. The Contractor shall include in the work, without extra cost, any labor, materials, services, apparatus or drawings required in order to comply with all applicable laws, ordinances rules and regulations, whether or not shown on drawings and/or specified.

D. All materials furnished and all work installed shall comply with the current edition of the National Electrical Codes, National Fire Codes of the National Fire Protection Association, the requirements of local utility companies, and with the requirements of all governmental agencies or departments having jurisdiction.

E. All material and equipment for the electrical systems shall bear the approval label, or shall be listed by the Underwriters' Laboratories, Incorporated. Listings by other testing agencies may be acceptable with written approval by the Engineer.

F. All electrical work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Fire Marshal, as applicable or required. Electrical work shall not commence until such plans are in the hands of the Electrical Contractor.
G. The Contractor shall insure that his work is accomplished in accord with OSHA Standards and any other applicable government requirements.

H. Where conflict arises between any code and the plans and/or specifications, the code shall apply except in the instance where the plans and specifications exceed the requirements of the code. Any changes required as a result of these conflicts shall be brought to the attention of the Engineer at least ten working days prior to bid date, otherwise the Contractor shall make the required changes at his own expense. The provisions of the codes constitute minimum standards for wiring methods, materials, equipment and construction and compliance therewith will be required for all electrical work, except where the drawings and specifications require better materials, equipment, and construction than these minimum standards, in which case the drawings and specifications shall be the minimum standards.

8. COST BREAKDOWNS/SCHEDULE OF VALUES

A. Within thirty days after acceptance of the Contract, the Contractor is required to furnish to the Engineer one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made on forms provided or approved by the Engineer or Architect. Payments will not be made until satisfactory cost breakdowns are submitted. Refer to the end of this section for a sample of expected level and breakout being required.

9. CORRECTION PERIOD

A. All equipment, apparatus, materials, etc., shall be the best of its respective kind. The Contractor shall replace all materials at his own expense, which fail or are deemed defective as described in the General Conditions. The effective date of completion of the work shall be the date each or any portion of the work is accepted by the Architect or Engineer as being substantially complete.

B. Items of equipment which have longer guarantees, as called for in these specifications or as otherwise offered by the manufacturer, such as generators, engines, batteries, transformers, etc., shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall in no way invalidate the guarantee except that Owner shall be liable for any damage to equipment during this period due to negligence of his operator or other employee.

10. INSPECTION, APPROVALS AND TESTS

A. Before requesting a final review of the installation from the Architect and/or Engineer, the Contractor shall thoroughly inspect his installation to assure that the work is complete in every detail and that all requirements of the Contract Documents have been fulfilled. Failure to accomplish this may result in charges from the Architect and/or Engineers for unnecessary and undue work on their part.

B. The Contractor shall provide as part of this contract electrical inspection by a competent Electrical Inspection Agency, licensed to provide such services in the Commonwealth of Kentucky. The name of this agency shall be included in the list of materials of the Form of Proposal by the Contractor. All costs incidental to the provision of electrical inspections shall be borne by the Electrical Contractor.

C. The Contractor shall advise each Inspection Agency in writing (with an information copy of the correspondence to the Architect and/or Engineer) when he anticipates commencing work. Failure of the Inspection Agency to inspect the work in the stage following and submit the related reports
may result in the Contractor’s having to expose concealed work not so inspected. Such exposure will be at the expense of the responsible Contractor.

D. Inspections shall be scheduled for rough as well as finished work. The rough inspections shall be divided into as many inspections as may be necessary to cover all roughing-in without fail. Report of each such inspection visit shall be submitted to the Architect, Engineer and the Contractor within three days of the inspection.

E. Approval by an Inspector does not relieve the Contractor from the responsibilities of furnishing equipment having a quality of performance equivalent to the requirements set forth in these plans and specifications. All work under this contract is subject to the review of the Architect and/or Engineer, whose decision is binding.

F. Before final acceptance, the Contractor shall furnish three copies of the certificates of final approval by the Electrical Inspector (as well as all other inspection certificates) to the Engineer with one copy of each to the appropriate government agencies, as applicable. Final payment for the work shall be contingent upon completion of this requirement.

G. The Contractor shall test all wiring and connections for cross connects, continuity and grounds before equipment and fixtures are connected, and when indicated or required, demonstrate by continuity/load/voltage test and Megger Test the installation of any circuit or group of circuits. Where such tests indicate the possibility of faulty insulation, locate the point of such fault, replacing same with new and demonstrate by further test the elimination of such defect. The secondary service entrance conductors from the utility (source) transformer to the main service disconnecting means shall be megger tested. The results of this test shall be turned over to the engineer for review and approval. Any conductor failing the test shall be replaced and any costs associated shall be borne by the contractor.

11. COMPUTER-BASED SYSTEM SOFTWARE

A. For all equipment, controls, hardware, computer-based systems, programmable logic controllers, and other materials provided as a part of the work, software that is installed shall be certified in writing to the Engineer and Owner by the manufacturer and/or writer to be free of programming errors that might affect the functionality of the intended use.

12. CHANGES IN ELECTRICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

13. CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

14. SURVEYS, MEASUREMENTS AND GRADES

A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.

B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.
C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Engineer thru normal channels of job communication and shall not proceed with his work until he has received instructions from the Engineer.

15. TEMPORARY USE OF EQUIPMENT

A. The permanent electrical equipment, when installed, may be used for temporary services, subject to an agreement among the Contractors involved, the Owner, and with the consent of the Engineer. Should the permanent systems be used for this purpose, each Contractor shall pay for all temporary connections required and any replacements required due to damage without cost, leaving the equipment and installation in "as new" condition. The Contractor may be required to bear utility costs, user fees, etc.

B. Permission to use the permanent equipment does not relieve the Contractors who utilize this equipment from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

16. TEMPORARY SERVICES

A. The Contractor shall arrange for temporary electrical and other services which he may require to accomplish his work. In the absence of other provisions in the contract, the Contractor shall provide for his own temporary services of all types, including the cost of connections, utility company fees, construction, removal, etc., in his bid.

17. RECORD DRAWINGS

A. The Contractor shall insure that any deviations from the design are being recorded daily or as necessary on record drawings being maintained by the Contractor. Dimensions from fixed, visible permanent lines or landmarks shown in vertical and horizontal ways shall be utilized. Compliance shall be a requirement for final payment. Pay particular attention to the location of underfloor or underground exterior in-contract or utility-owned or leased service lines, main switches and other appurtenances important to the maintenance and safety of the Electrical System. Keep information in a set of drawings set aside at the job site especially for this purpose. Deliver these record drawings electronically to the Engineer in AutoCad 2000 format (or more recent version) along with the hand marked field set. Electronic bid drawings will be furnished to the Contractor for his use at the completion of the work.

18. MATERIALS AND WORKMANSHP

A. All electrical equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by electricians skilled and regularly employed in their respective trades. The Contractor shall determine that the equipment he proposes to furnish can be brought into the building(s) and installed within the space available. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s).

B. All conduit and/or conductors shall be concealed in or below walls, floors or above ceilings unless otherwise noted. All fixtures, devices and wiring required shall be installed to make up complete systems as indicated on the drawings and specified herein.
C. All materials, where applicable, shall bear Underwriters' Laboratories label or that of another Engineer-approved testing agency, where such a standard has been established.

D. Each length of conduit, wireway, duct, conductor, cable, fitting, fixture and device used in the electrical systems shall be stamped or indelibly marked with the makers mark or name.

E. All electrical equipment shall bear the manufacturer's name and address and shall indicate its electrical capacity and characteristics.

F. All electrical materials, equipment and appliances shall conform to the latest standards of the National Electric Manufacturers Association (NEMA) and the National Board of Fire Underwriters (NBFU) and shall be approved by the Owner's insuring agency if so required.

19. QUALIFICATIONS OF WORKMEN

A. All electrical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen as evidenced by their workmanship shall be relieved of their responsibilities in those areas. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workmen shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of responsibility established by the Architect or the contract document provisions.

B. All electrical work shall be accomplished by Journeymen electricians under the direct supervision of a licensed Electrician. All applicable codes, utility company regulations, laws and permitting authority of the locality shall be fully complied with by the Contractor.

C. Special electrical systems, such as Fire Detection and Alarm Systems, Intercom or Sound Reinforcement Systems, Telecommunications or Data Systems, Lightning Protection Systems, Video Systems, Special Electronic Systems, Control Systems, etc., shall be installed by workmen normally engaged or employed in these respective trades. As an exception to this, where small amounts of such work are required and are, in the opinion of the Engineer, within the competency of workmen directly employed by the Contractor involved, they may be provided by this Contractor.

20. CONDUCT OF WORKMEN

A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workmen to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption or influence of alcoholic beverages, narcotics or illegally used controlled substances on the jobsite is strictly forbidden.

21. COOPERATION AND COORDINATION BETWEEN TRADES

A. The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Mechanical, Structural and other pertinent Drawings, to the end that complete coordination between trades will be effected.

B. Refer to Coordination Among Trades, Systems Interfacing and Connection of Equipment Furnished by Others section of these Specifications for further coordination requirements.
22. PROTECTION OF EQUIPMENT

A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from damage during the construction period. Such protection shall be by a means acceptable to the Engineer. All rough-in conduit shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged while stored on site either before or after installation shall be repaired or replaced (as determined by the Engineer) by the responsible Contractor.

23. CONCRETE WORK

A. The Contractor shall be responsible for the provision of all concrete work required for the installation of any of his systems or equipment. If this work is provided by another trade, it will not relieve the Electrical Contractor of his responsibilities relative to dimensions, quality of workmanship, locations, etc. In the absence of other concrete specifications, all concrete related to Electrical work shall be 3000 PSI minimum compression strength at 28 days curing and shall conform to the standards of the American Concrete Institute Publication ACI-318. Heavy equipment shall not be set on pads for at least seven days after pour.

B. All concrete pads shall be complete with all pipe sleeves, embeds, anchor bolts, reinforcing steel, concrete, etc., as required. Pads larger than 18" in width shall be reinforced with minimum #4 round bars on 6" centers both ways. All reinforcing steel shall be per ASTM requirements, tied properly, lapped 18 bar diameters and supported appropriately up off form, slab or underlayment. Bars shall be approximately 3" above the bottom of the pad with a minimum 2" cover. All parts of pads and foundations shall be properly rodded or vibrated. If exposed parts of the pads and foundations are rough or show honeycomb after removing forms properly adhered repairs shall be made. If structural integrity is violated, the concrete shall be replaced. All surfaces shall be rubbed to a smooth finish.

Special Note: All pads and concrete lighting standard bases shall be crowned slightly so as to avoid water ponding beneath equipment.

C. In general, concrete pads for small equipment shall extend 6" beyond the equipment's base dimensions. For large equipment with service access panels, extend pads 18" beyond base or overall dimensions to allow walking and servicing space at locations requiring service access.

D. Exterior concrete pads shall be 4" minimum above grade and 4" below grade on a tamped 4" dense grade rock base unless otherwise noted or required by utility company. Surfaces of all foundations and bases shall have a smooth finish with three-quarter inch radius or chamfer on exposed edges, trowelled or rubbed smooth. All exterior pads shall be crowned approximately 1/8" per foot, sloping from center for drainage.

24. RESTORATION OF NEW OR EXISTING SHRUBS, PAVING, ETC.

A. The Contractor shall restore to their original condition all paving, curbing surfaces, drainage ditches, structures, fences, shrubs, existing or new building surfaces and appurtenances, and any other items damaged or removed by his operations. Replacement and repairs shall be in accordance with good construction practice and shall match materials employed in the original construction of the item to be replaced. All repairs shall be to the satisfaction of the Engineer, and in accord with the Architect's standards for such work, as applicable.

25. MAINTENANCE OF EXISTING UTILITIES AND LINES
A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that come within the contract construction site, shall be subject to continuous uninterrupted maintenance with no exception unless the Owner of the utilities grants permission to interrupt same temporarily, if need be. Provide one week's written notice to Engineer, Architect and Owner prior to interrupting any utility service or line. Also see Article 1. - General, this section.

B. Known utilities and lines as available to the Engineer are shown on the drawings. However, it is additionally required that, prior to any excavation being performed, each Contractor ascertain that no utilities or lines, known or unknown, are endangered by the excavation.

C. If the above mentioned utilities or lines occur in the earth within the construction site, the Contractor shall first probe and make every effort to locate the lines prior to excavating in the respective area.

D. Cutting into existing utilities and services shall be done in coordination with and as designated by the Owner of the utility. The Contractor shall work continuously to restore service(s) upon deliberate or accidental interruption, providing premium time and materials as needed without extra claim to the Owner.

E. The Contractor shall repair to the satisfaction of the Engineer any surface or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.

F. Machine excavation shall not be permitted within ten feet of existing gas or fuel lines. Hand excavate only in these areas, in accord with utility company, agency or other applicable laws, standards or regulations.

G. Protect all new or existing lines from damage by traffic, etc. during construction.

H. Protect existing trees, indicated to remain with fencing or other approved method. Hold all new subsurface lines outside the drip line of trees, offsetting as necessary to protect root structures. Refer to planting or landscaping plans, or in their absence, consult with the Architect.

26. SMOKE AND FIRE PROOFING

A. The Contractor shall not penetrate rated fire walls, ceilings or floors with conduit, cable, bus duct, wireway or other raceway system unless all penetrations are protected in a code compliant manner which maintains the rating of the assembly. Smoke and fire stop all openings made in walls, chases, ceiling and floors. Patch all openings around conduit, wireway, bus duct, etc., with appropriate type material to smoke stop walls and provide needed fire rating at fire walls, ceilings and floors. Smoke and fire proofing materials and method of application shall be approved by the local authority having jurisdiction.

27. QUIET OPERATION, SUPPORTS, VIBRATION AND OSCILLATION

A. All work shall operate under all conditions of load without any objectionable sound or vibration, the performance of which shall be determined by the Engineer. Noise from moving machinery or vibration noticeable outside of room in which it is installed, or annoyingly noticeable noise or vibration inside such room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor (or Contractors responsible) at his expense.
B. All equipment subject to vibration and/or oscillation shall be mounted on vibration supports suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc., by means of flexible connectors, vibration absorbers or other approved means. Surface mounted equipment such as panels, switches, etc., shall be affixed tightly to their mounting surface.

C. The Contractor shall provide supports for all equipment furnished by him using an approved vibration isolating type as needed. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment, piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. No work shall depend on the supports or work of unrelated trades unless specifically authorized in writing by the Architect or Engineer.

28. FINAL CONNECTIONS TO EQUIPMENT

A. The roughing-in and final connections to all electrically operated equipment furnished under this and all other sections of the contract documents or by others, shall be included in the Contract and shall consist of furnishing all labor and materials for connection. The Contractor shall carefully coordinate with equipment suppliers, manufacturers representatives, the vendor or other trades to provide complete electrical and dimensional interface to all such equipment (kitchen, hoods, mechanical equipment, panels, refrigeration equipment, etc.).

29. ACCESSIBILITY

A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in partitions and above suspended ceilings for the proper installation of his work. He shall cooperate with the General Contractor (or Construction Manager) and all other Contractors whose work is in the same space, and shall advise each Contractor of his requirements. Such spaces and clearances shall be kept to the minimum size required to ensure adequate clearance and access.

B. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to junction boxes, pull boxes, contactors, panels, disconnects, controllers, switchgear, etc. Minor deviations from drawings may be made to allow for better accessibility, and any change shall be approved where the equipment is concealed.

C. Each Contractor shall provide (or arrange for the provision by other trades) the access panels for each concealed junction box, pull box, fixtures or electrical device requiring access or service as shown on Engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work. All access panels shall be installed in accord with the Architect's standards for such work.

D. Access Doors; in Ceilings or Walls:

   (1) In mechanical, electrical, or service spaces:
       14 gauge aluminum brushed satin finish, 1” border.

   (2) In finished areas:
14 gauge primed steel with 1” border to accept the architectural finishes specified for the space. Confirm these provisions with the Architect prior to obtaining materials or installing any such work.

(3) In fire or smoke rated partitions, access doors shall be provided that equal or exceed the required rating of the construction they are mounted in.

30. ELECTRICAL CONNECTIONS

A. The Contractor shall furnish and install all power wiring complete from power source to motor or equipment junction box, including power wiring through starters. The Contractor shall install all starters not factory mounted on equipment. Unless otherwise noted, the supplier of equipment shall furnish starters with the equipment. Also refer to Divisions 11, 14, 20, 21, 22, 23 and 25 of the Specifications, shop drawings and equipment schedules for additional information.

B. All control, interlock, sensor, thermocouple and other wiring required for equipment operation shall be provided by the Contractor. All such installations shall be fully compliant with all requirements of Division 26 and 27 regardless of which trade actually installs such wiring. Motors and equipment shall be provided for current and voltage characteristics as indicated or required. All wiring shall be enclosed in raceways unless otherwise noted.

C. Each Contractor or sub-contractor, prior to bidding the work, shall coordinate power, control, sensor, interlock and all other wiring requirements for equipment or motors with all other contractors or sub-contractors, to ensure all needed wiring is provided in the Contract. Failure to make such coordination shall not be justification for claims of extra cost or a time extension to the Contract.

31. MOTORS

A. Each motor shall be provided by the equipment supplier, installer or manufacturer with conduit terminal box and N.E.C. required disconnecting means as indicated or required. Three-phase motors shall be provided with external thermal overload protection in their starter units. Single-phase motors shall be provided with thermal overload protection, integral to their windings or external, in control unit. All motors shall be installed with NEMA-rated starters as specified and shall be connected per the National Electrical Code.

B. The capacity of each motor shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or specified. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower as applicable. Motors producing excessive noise or vibration shall be replaced by the responsible contractor. See Division 20, 22 and 23 of the Specifications for further requirements and scheduled sizes.

C. All three-phase motors shall be tested for proper rotation. Correct wiring if needed and retest. Document testing and corrective action in operations and maintenance manual.

32. CUTTING AND PATCHING

A. Unless otherwise indicated or specified, the Contractor shall provide cutting and patching necessary to install the work specified in this Division. Patching shall match adjacent surfaces to the satisfaction of the Engineer and shall be in accord with the Architect's standards for such work, as applicable.
B. No structural members shall be cut without the approval of the Structural Engineer and all such cutting shall be done in a manner directed by him.

C. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

33. ANCHORS

A. Each Contractor shall provide and locate all inserts required for his work before the floors and walls are built, or shall be responsible for the cost of cutting and patching required where inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers. Drilling of anchor holes may be prohibited in post-tensioned concrete construction, in which case the Contractor shall request approved methods from the Architect and shall carefully coordinate setting of inserts, etc., with the Structural Engineer and/or Architect.

34. WEATHERPROOFING

A. Where any work pierces waterproofing, including waterproof concrete, the method of installation shall be as approved by the Architect and/or Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.

B. Wherever work penetrates roofing, it shall be done in a manner that will not diminish or void the roofing guarantee or warranty in any way. Coordinate all such work with the roofing installer.

35. OPERATING INSTRUCTIONS

A. Upon completion of all work and all tests, each Contractor shall furnish the necessary skilled labor and helpers for operating his systems and equipment for a period of three days of eight hours each, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operations, adjustment, and maintenance of all equipment furnished. Give at least one week's written notice to the Owner, Architect and Engineer in advance of this period. The Engineer may attend any such training sessions or operational demonstrations. The Contractor shall certify in writing to the Engineer that such demonstrations have taken place, noting the date, time and names of the Owner's representative that were present.

B. Each Contractor shall furnish three complete bound sets for approval to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.

C. Each Contractor, in the above mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this contract and a detailed, easy to read parts list and the name and address of the nearest source of supply.

D. Formatting & content shall follow the guidelines outlined in the latest version of ASHRAE Applications Handbook, Guideline 4. As a minimum, the following shall be included:
The operation and maintenance document directory should provide easy access and be well organized and clearly identified.

Emergency information should be immediately available during emergencies and should include emergency and staff and/or agency notification procedures.

The operating manual should contain the following information:

I. General Information
   a. Building function
   b. Building description
   c. Operating standards and logs

II. Technical Information
   a. System description
   b. Operating routines and procedures
   c. Seasonal start-up and shutdown
   d. Special procedures
   e. Basic troubleshooting

The maintenance manual should contain the following information:

I. Equipment data sheets
   a. Operating and nameplate data
   b. Warranty

II. Maintenance program information
   a. Manufacturer’s installation, operation, and maintenance instructions
   b. Spare parts information
   c. Preventive maintenance actions
   d. Schedule of actions
   e. Action description
   f. History

Test reports document observed performance during start-up and commissioning.

36. SCAFFOLDING, RIGGING AND HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

37. CLEANING

A. The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish caused by his operations; and at the completion of the work, shall remove all rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the Contractor does not attend to such cleaning immediately upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the responsible Contractor. Each Contractor shall be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.

B. After completion of all work and before final acceptance of the work, each Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of materials, equipment and all
associated fabrication. Pay particular attention to finished area surfaces such as lighting fixture lenses, lamps, reflectors, panels, etc.

38. PAINTING

A. Each fixture device, panel, junction box, etc., that is located in a finished area shall be provided with finish of color and type as selected or approved by the Architect or Engineer. If custom color is required, it shall be provided at no additional cost to the Owner. All other equipment, fixtures or devices located in finished or unfinished areas, that are not required to have or are provided with finish color or coating shall be provided in a prime painted condition, ready to receive finish paint or coating. All galvanized metal in finished areas shall be properly prepared with special processes to receive finish paint as directed and approved by the Architect.

39. INDEMNIFICATION

A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

40. HAZARDOUS MATERIALS

A. The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, insure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall insure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.

B. CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.

C. If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor’s sole responsibility to contact the Owner and so advise him immediately.

D. The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

41. ABOVE-CEILING AND FINAL PUNCH LISTS
A. The Contractor shall review each area and prepare a punch list for each of the subcontractors, as applicable, for at least two stages of the project:

(1) For review of above-ceiling work that will be concealed by tile or other materials well before substantial completion.

(2) For review of all other work as the project nears substantial completion.

B. When all work from the Contractor's punch list is complete at each of these stages and prior to completing ceiling installations (or at the final punch list stage), the Contractor shall request that the Engineer develop a punch list. This request is to be made in writing seven days prior to the proposed date. After all corrections have been made from the Engineer's punch list, the Contractor shall review and initial off on each item. This signed-off punch list shall be submitted to the Engineer. The Engineer shall return to the site once to review each punch list and all work prior to the ceilings being installed and at the final punch list review.

C. If additional visits are required by the Engineer to review work not completed by this review, the Engineer shall be reimbursed directly by the Contractor by check or money order (due net 10 days from date of each additional visit) at a rate of $140.00 per hour for extra trips required to complete either of the above-ceiling or final punch lists.

END OF SECTION 260501
SECTION 260502 - SCOPE OF THE ELECTRICAL WORK

1. GENERAL

Each Electrical Contractor's attention is directed to Section 260501 - General Provisions, Electrical, and all other Contract Documents as they apply to his work.

2. SCOPE OF THE ELECTRICAL WORK

The Electrical work for this project includes all labor, materials, equipment, fixtures, excavation, backfill and related items required to completely install, test, verify place in service and deliver to the Owner complete electrical systems in accordance with the accompanying plans and all provisions of these specifications. This work shall primarily include, but is not limited to the following:

A. All conduits, conductors, outlet boxes, fittings, etc.

B. All switchgear, panels, disconnect switches, fuses, transformers, contactors, starters, etc.

C. Fault Current Coordination Study.

D. A complete grounding system for both power and telecommunication systems. A new telecommunication ground bus with a #1/0 ground to building ground bus is required in the new LAN/TELCO Room.

E. Demolition and rework of existing devices in area of renovation. Salvage and reuse equipment and devices as indicated including power distribution panels. Recircuit existing feeders and conductors as needed.

F. All wiring devices and device plates.

G. All light fixtures and lamps.

H. Lighting controls including occupancy sensors, low voltage control switches, line voltage control switches, networked lighting relays, etc.

I. Electrical connection to all electrically operated equipment furnished and/or installed by others, including powered casework, kitchen equipment, etc.

J. Digital video surveillance system (power and raceway only – coordinate installation with security vendor)

K. Security intrusion detection system (power and raceway only – coordinate installation with security vendor and door hardware)

L. Digital intercom system (including all cable, raceway, and power)

M. Voice/Data wiring system.

N. Fire alarm system (expansion of existing system)

O. All necessary coordination with electric utility company, telephone company, cable television company, etc. to insure that work, connections, etc., that they are to provide is accomplished and that service to this facility is delivered complete prior to occupancy.
P. Paying all necessary fees and cost for permits, inspections, work by utility companies (power, telephone, CATV, etc). The Contractor shall contact the utility companies prior to submitting a bid to determine exactly these charges will be.

Q. Prior to submitting a bid, the Contractor shall contact all serving utility companies to determine exactly what each utility company will provide and exactly what is required of the Contractor and the Contractor shall include all such requirements in his base bid.

END OF SECTION 260502
SECTION 260503 - SHOP DRAWINGS, LITERATURE, MANUALS, PARTS LISTS, AND SPECIAL TOOLS

1. SHOP DRAWINGS

A. Each Contractor shall submit to the Architect and/or Engineer, within thirty days after the date of the Contract, seven sets of shop drawings and/or manufacturer's descriptive literature on all equipment required for the fulfillment of his contract. Each shop drawing and/or manufacturer's descriptive literature shall have proper notation indicated on it and shall be clearly referenced so the specifications, schedules, light fixture numbers, panel names and numbers, etc., so that the Architect and/or Engineer may readily determine the particular item the Contractor proposes to furnish. All data and information scheduled, noted or specified by hand shall be noted in color red on the submittals. The Contractor shall make any corrections or changes required and shall resubmit for final review as requested. Review of such drawings, descriptive literature and/or schedules shall not relieve the Contractor from responsibility for deviation from drawings or specifications unless they have, in writing, directed the reviewer's attention to such deviations at the time of submission of drawings, literature and manuals; nor shall it relieve them from responsibility for errors or omissions of any nature in shop drawings, literature and manuals. The term "as specified" will not be accepted.

B. If the Contractor fails to comply with the requirements set forth above, the Architect and/or Engineer shall have the option of selecting any or all items listed in the specifications or on the drawings, and the Contractor will be required to provide all materials in accordance with this list.

C. Review of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the installing Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.

D. The Engineer's review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for the adaptability of the equipment or materials to the project, compliance with applicable codes, rules, regulations, information that pertains to fabrication and installation, dimensions and quantities, electrical characteristics, and coordination of the work with all other trades involved in this project.

E. No cutting, fitting, rough-in, connections, etc., shall be accomplished until reviewed equipment shop drawings are in the hands of the Contractors concerned. It shall be each Contractor's responsibility to obtain reviewed shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. Each Contractor shall coordinate with all the other Contractors having any connections, roughing-in, etc., to the equipment, to make certain proper fit, space coordination, voltage and phase relationships are accomplished.

F. In accord with the provisions specified hereinbefore, shop drawings, descriptive literature and schedules shall be submitted on each of the following indicated items as well as any equipment or systems deemed necessary by the Engineer:

- Power Equipment
  - Fault current coordination study (submit along with switchgear & panelboards).
- Switchgear and panelboards.
- Circuit breakers or fusible switches, per each type.
- Dry-type transformers.
- Power and lighting contactors.
- Disconnect switches.
- Fuses, per each type required.
- Magnetic starters, if not submitted with unit equipment by supplier.
- Control components (relays, timers, selector switches, pilots, etc.)
- Building service grounding electrode components.
- Grounding system.

Raceways

- Cable tray and each type of cable tray fitting.
- Wireways and each type of wireway fitting.
- Surface-mounted metal or plastic raceways, with each type of fitting.
- J-hook or Bridle ring assemblies.

Devices

- Each type of wiring device and their coverplates.
- Floor boxes, each by type, with required accessories.
- Data/voice/video wallplates, each by type.
- Any special items not listed above.

Lighting

- Light fixtures, each by type, marked to indicate all required accessories and driver selection. Also provide original color selection chart to allow Architect and/or Engineer to indicate color selection.
- Photocells, time clocks or other lighting accessories.
- Lighting control system schematic, functional & programming data, along with building specific floor plan drawings indicating each device, master controller, input device locations and specific interconnect/wiring requirements for each device.

Systems

**Note:** Each system submittal is to be complete with legible cutsheets for all devices, equipment, special wiring, etc. Include system specific wiring schematics showing each device and its specific interconnect/wiring requirements. For rack mounted equipment, provide a scalable elevation drawing with proposed component locations & specific interconnect wiring requirements for each component/panel. Also provide scale building specific layout drawings that indicate device placement, wiring, etc. Refer to the specific system’s specification for additional submittal requirements where required.

- Fire alarm system.
- Closed circuit television security system (coordinated power and raceway)
- Intrusion detection system (coordinated power and raceway)
- Intercom audio system.
- Telephone system.
- Video system.
- Data network.
Miscellaneous

- Control panel assemblies.
- Non-standard junction/pullboxes.

2. SPECIAL WRENCHES, TOOLS AND KEYS

A. Each Contractor shall provide, along with the equipment provided, any special wrenches or tools necessary to dismantle or service equipment or appliances installed by him. Wrenches shall include necessary keys, handles and operators for valves, switches, breakers, etc. and keys to electrical panels, emergency generators, alarm pull boxes and panels, etc. At least two of any such special wrench, keys, etc. shall be turned over to the Architect prior to completion of the project. Obtain a receipt that this has been accomplished and forward a copy to the Engineer.

3. FIRE ALARM SHOP DRAWINGS

A. The Contractor and equipment supplier shall submit to the Architect and/or Engineer, fire alarm system shop drawings complete with catalog cuts, descriptive literature and complete system wiring diagrams for their review prior to the Contractor's submittal to the Commonwealth's Department of Housing, Buildings and Construction or other governing authority for their review. No work shall be done until drawings are approved by the Kentucky Department of Housing, Buildings and Construction.

4. MAINTENANCE AND OPERATION MANUALS

A. Upon substantial completion of the project, the Contractor shall deliver to the Engineers (in addition to the required Shop Drawings) three complete copies of operation and maintenance instructions and parts lists for all equipment provided. Formatting and content shall follow the guidelines outlined in the latest version of ASHRAE Application Handbook, Guideline 4. As a minimum, the following shall be included:

- The operation and maintenance document directory should provide easy access and be well organized and clearly identified.
- Emergency information should be immediately available during emergencies and should include emergency and staff and/or agency notification procedures.
- The operating manual should contain the following information:
  I. General Information
     a. Building function
     b. Building description
     c. Operating standards and logs
  II. Technical Information
     a. System description
     b. Operating routines and procedures
     c. Seasonal start-up and shutdown
     d. Special procedures
     e. Basic troubleshooting

- The maintenance manual should contain the following information:
  I. Equipment data sheets
     a. Operating and nameplate data
b. Warranty

II. Maintenance program information
   a. Manufacturer’s installation, operation, and maintenance instructions
   b. Spare parts information
   c. Preventive maintenance actions
   d. Schedule of actions
   e. Action description
   f. History

- **Test reports** document observed performance during start-up and commissioning.

END OF SECTION 260503
SECTION 260504 - SLEEVING, CUTTING, PATCHING AND REPAIRING

1. GENERAL

A. The Contractor shall be responsible for all openings, sleeves, trenches, etc. that he may require in floors, roofs, ceilings, walls, etc. and shall coordinate all such work with the General Contractor and all other trades. He shall determine and coordinate any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the responsible Contractor.

B. The Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for conduit, buss duct, conductors, wireways, etc. to go through; however, when this is not done, this Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Architect. Any damage caused to the building by the workmen of the responsible Contractor must be corrected or rectified by him at his own expense.

C. The Contractor shall cut holes in casework, equipment panels, etc. (if any), as required to pass pipes in and out.

D. The Contractor shall notify other trades in due time where he will require openings of chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.

E. Openings in slabs and walls shall be cut with core drill. Hammer devices will not be permitted. Edges of trenches and large openings shall be scribe cut with a masonry saw.

F. Cast iron sleeves shall be installed through all walls where pipe enters the building below grade. Sleeves shall be flush with each face of the wall and shall be sufficiently larger than the entering pipe to permit thorough caulking with lead and oakum between pipe and sleeve for waterproofing.

G. In all cases, sleeves shall be at least two pipe sizes larger than nominal pipe diameter.

H. Sleeves passing through roof or exterior wall or where there is a possibility of water leakage and damage shall be caulked water tight for horizontal sleeves and flashed and counter-flashed with lead (4 lb.) or copper and soldered to the piping, lapped over sleeve and properly weather sealed. Any roof penetration shall not void or lessen the warranty in any way.

I. All rectangular or special shaped openings in plaster, stucco or similar materials including gypsum board shall be framed by means of plaster frames, casing beads, wood or metal angle members as required. The intent of this requirements is to provide smooth even termination of wall, floor and ceiling finishes as well as to provide a fastening means for lighting fixtures, panels, etc. Lintels shall be provided where indicated over all openings in bearing walls, etc.

J. No cutting is to be done at points or in a manner that will weaken the structure and unnecessary cutting must be avoided. If in doubt, contact the Architect.

K. The Contractor shall be responsible for properly shoring, bracing, supporting, etc. any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Architect.
L. All work improperly done or not done at all as required by the Contractor will be performed by others. The cost of this work shall be paid for by the Contractor who is in non-compliance with the Contract.

2. SLEEVES, PLATES AND ESCUTCHEONS

A. The Contractor shall provide and locate all sleeves required for his work before the floors and surface being penetrated are built, otherwise the Contractor shall core drill for conduits where sleeves were not installed, or where incorrectly located. Core drilling is the only acceptable alternative to sleeves. Do not chisel openings. Where sleeves are placed in exterior walls or in slabs on grade, the space between the conduit and the sleeves shall be made completely and permanently water tight.

B. Conduits that penetrates fire and/or smoke rated assemblies shall have sleeves installed as required by the manufacturer of the rating seal used.

C. At all other locations either pipe sleeves or core drilled openings are acceptable.

D. Where thermal expansion does not occur, the wall may be sealed tight to the conduit.

E. Sleeves shall be constructed of 24 gauge galvanized sheet steel with lock seam joints or Schedule 40 pipe. Sleeves in floors shall extend 1" above finished floor level.

F. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction.

G. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4 inch high by 3 inch wide concrete curb.

END OF SECTION 260504
SECTION 260505 - DEMOLITION, RESTORATION AND SALVAGE

1. GENERAL

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and all other divisions of these specifications apply to work specified in this section.

2. DESCRIPTION OF WORK

A. This section covers all demolition, restoration and salvage required to perform the electrical work indicated on the drawings, specified and/or as required to complete the project. It is the intent of this section of work to remove all existing electrical equipment, materials, etc. which are not required for the completed building and to restore any and all finished surfaces to their original type and conditions. To accomplish these requirements, the Contractor(s) shall, at his own expense, engage the services of others already performing finish work on this project. All work shall be completed to the satisfaction of the Architect/Engineers whose decisions shall be final. This requirement shall apply to all restoration work whether indicated or specified.

B. The Contractor shall lawfully dispose of any removed P.C.B.-bearing ballasts (containing polychlorinated biphenyl), and all mercury-vapor bearing lamps, in accordance with all state, local, federal and other applicable laws and regulations.

3. ELECTRICAL

A. Where electrical fixtures, equipment or other materials are removed and/or relocated, all abandoned conduit and conductors shall be removed in exposed areas. In concealed areas, materials shall be abandoned in place or removed as indicated and patch all openings.

B. The Contractor shall be responsible for the removal and/or relocation of any electrical equipment, fixtures, devices, appurtenances, etc., which may, in the course of construction, interfere with the installation of any new and/or relocated Architectural, Mechanical, Electrical, Structural or Fire Protection Systems whether indicated or not.

4. REPAIR

A. Unless otherwise indicated, the Contractor shall be responsible for the patching and repairing of all holes, etc. in the ceiling, wall and floors where electrical equipment is removed.

5. SALVAGE

A. It is the intent of this section to deliver to the Owner all components of any electrical system which may be economically reused by him. The Contractor shall make every effort to remove reusable components without damage and deliver them to a location designated by the Owner.

B. Salvage existing equipment as indicated including, but not limited to, electrical distribution panels, card access controllers, card access readers, and all main service distribution equipment and network switches.

END OF SECTION 260505
SECTION 260508 - COORDINATION AMONG TRADES, SYSTEMS INTERFACING AND CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

1. COORDINATION

A. The Contractor is expressly directed to read the General Conditions and all sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Plumbing, Fire Protection, Mechanical and Structural drawings, to the end that complete coordination between trades will be affected. Each Contractor shall make known to all other contractors the intended positioning of materials, raceways, supports, equipment and the intended order of his work. Coordinate all work with other trades and proceed with the installation in a manner that will not create delays for other trades or affect the Owner's operations.

B. Special attention to coordination shall be given to points where raceways, fixtures, etc., must cross other ducts or conduit, where lighting fixtures must be recessed in ceilings, and where fixtures, conduit and devices must recess into walls, soffits, columns, etc. It shall be the responsibility of each Contractor to leave the necessary room for other trades. No extra compensation or time will be allowed to cover the cost of removing fixtures, devices, conduit, ducts, etc. or equipment found encroaching on space required by others.

C. The Contractor shall be responsible for coordination with all trades to insure that they have made provision for connections, operational switches, disconnect switches, fused disconnects, etc., for electrically operated equipment provided under this or any other division of the specifications, or as called for on the drawings. Any connection, circuiting, disconnects, fuses, etc., that are required for equipment operation shall be provided as a part of this contract.

D. If any discrepancies occur between accompanying drawings and these specifications and drawings and specifications covering other trade's work, each trade shall report such discrepancies to the Architect far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of fixtures, devices, conduit, and equipment not installed or connected in accordance with the above instructions.

E. In all areas where air diffusers, devices, lighting fixtures and other ceiling-mounted devices are to be installed, the Mechanical Trade(s) and the Electrical Trade and the General Trades shall coordinate their respective construction and installations so as to provide a combined symmetrical arrangement that is acceptable to the Architect and Engineer. Where applicable, refer to reflected ceiling plans. Request layouts from the Architect or Engineer where in doubt about the potential acceptability of an installation.

2. INTERFACING

Each Electrical Trade, Specialty Controls Trade, Mechanical Trade and the General Trades, etc., shall insure that coordination is effected relative to interfacing of all systems. Some typical interface points are (but not necessarily all):

A. Connection of Telecommunications (voice, video, data) lines to Owner's existing services.

B. Connection of panels to Owner's existing services.

C. Connection of all controls to equipment.

D. Electrical power connections to electrically operated (or controlled) equipment.
E. Electrical provisions for all equipment provided by other trades or suppliers within this contract.

3. CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

A. Each Contractor shall make all connections to equipment furnished by others, whenever such equipment is shown on any part of the drawings or mentioned in any part of the Specifications, unless otherwise specifically specified hereinafter.

B. All drawings are complementary, one trade of the other. It is the Contractor's responsibility to examine all drawings and specifications to determine the full scope of his work. The project Engineers have arranged the specifications and drawings in their given order solely as a convenience in organizing the project, and in no way shall they imply the assignment of work to specific trades, contractors, subcontractors or suppliers.

C. Supervision to assure proper installation, functioning and operation shall be provided by the Contractor furnishing the equipment or apparatus to be connected.

D. Items indicated on the drawings as rough-in only (RIO) will be connected by the equipment supplier or Owner, as indicated. The Contractor shall be responsible for rough-in provisions only as indicated. These rough-ins shall be in accord with the manufacturer's or supplier's requirements.

E. For items furnished by others, relocated, or RIO, the Contractor shall obtain from the supplier or shall field determine as appropriate, the exact rough-in locations and connection sizes for the referenced equipment.

F. The Contractor shall be responsible for coordinating with the General and all other trades, as necessary, to determine any and all final connections that he is to make to equipment furnished by others.

END OF SECTION 260508
CONDUCTORS, IDENTIFICATIONS 260519-1

BLUEGRASS LEXINGTON AIRPORT
GENERAL AVIATION FACILITY
SCB # 1508

SECTION 260519 - CONDUCTORS, IDENTIFICATION, SPLICING DEVICES & CONNECTORS

1. GENERAL

A. This section of the Specifications covers all of the electrical power, lighting, and control power (line voltage) conductors, but does not include communications, data or signal system conductors, which are specified separately in these specifications.

B. All conduits installed without conductors shall have a 200 lb. test nylon string installed for future use, tied off securely at each end.

C. No more than 40% conduit fill is permitted for any conduit system, including video, intercom, data, power or other signal circuits unless specifically indicated otherwise on the plans.

D. Lighting circuits: No more than five conductors shall be installed in conduit except for switch legs and travelers in multi-point switching arrangements.

E. Receptacle circuits: If multiple circuits are pulled in a single homerun, a dedicated neutral shall be provided for each phase conductor. In these cases, a maximum of seven conductors are permitted in a single conduit. Conductors shall be derated per N.E.C.

F. Intentional or unintentional painting of exposed low voltage or line voltage cabling is prohibited. The contractor shall ensure that exposed cabling is adequately protected from direct painting or overspray whether painting is required within the electrical specifications or required by other disciplines/trades. The contractor shall review the painting requirements for all disciplines and shall provide cabling protection as required. Where exposed cabling is being installed in exposed ceiling or wall spaces that are required to be painted, the contractor shall provide alternate options for cable colors and shall provide submittals for such cabling to engineer for approval.

2. MATERIALS

A. CONDUCTORS

(1) All conductors shall be 98% conductive annealed copper unless otherwise noted, UL listed and labeled.

(2) Lighting and receptacle branch circuits shall be not less than No. 12 copper wire or of the sizes shown on the drawings with Type THW, THHN or THWN insulation. All feeder circuits shall be Type THW or THWN of the size as shown on the Contract Drawings. THHN wiring shall only be installed in overhead, dry or damp locations. THWN or THW wiring shall be used for all circuits pulled in underground or other wet locations.

(3) Conductors No. 10 and smaller sizes of wire shall be solid. Conductors No. 8 and larger sizes shall be stranded.
(4) Conductors for fire alarm wiring shall be stranded and in full compliance with N.E.C. 760. All fire alarm conductors shall be installed within conduit and enclosed junction boxes.

(5) All wire on the project shall be new, in good condition, and shall be delivered in standard coils or reels.

(6) The color of the wire shall be selected to conform with Section 210-5 of the latest edition of the National Electrical Code. Refer also to 260519-4, Color Coding.

(7) All equipment grounding conductors shall have green color insulation or if larger than #8, shall be taped for two inches, green color at every termination and pullbox access point.

(8) Conductors used for motor connections and connections to vibrating or oscillating equipment shall be extra flexible.

(9) Conductors for main ground from neutral bus, equipment grounding bus, building steel, grounding grid and main cold water pipe connection shall be bare copper.

(10) All conductors shall be identified by color code and by means of labels placed on conductors in all junction boxes and at each terminal point with Brady, Ideal, T & B or approved equivalent labels indicating source, circuit No. or terminal No.

(11) Branch wiring and feeder conductors that are greater than 100' in length shall be increased at least one size to compensate for voltage drop. All circuits shall be installed and sized for a maximum 2% voltage drop. As calculated using 80% of the supply breaker rating as the load. Adjust conductors and conduit size accordingly for actual field installed conditions.

B. SPlicing DEVICES & CONNECTORS

(1) Splicing devices for use on No. 14 to No. 10 AWG conductors shall be pressure type such as T & B "STA-KON", Burndy, Reliable or approved equivalent.

(2) Wire nuts shall be spring pressure type, insulation 600V, 105°C insulation, up to #8 size. Greater than #6 Cu shall be a compression type connection, 600V insulation, cold shrink tubing, taped to restore full insulation value of the wire being spliced.

(3) Pressure crimp-applied ring type (or fork with upturned ends) terminations shall be employed on motor and equipment terminals where such terminals are provided on motor and equipment leads or on all stranded wire terminations using No. 10 AWG or smaller conductors.

(4) Splices, where necessary, shall be made with hydraulically-set "Hy-press" or equivalent crimped connectors. All splices shall be insulated to the full value of the wiring insulation using a cold-shrink kit or the equivalent in built-up materials.
(5) Large connectors (lugs) at terminals shall be mechanical type, hex-head socket or crimp-on style, installed per the manufacturer's recommendations.

(6) Exterior underground connections made between bare ground wires or to ground rods shall be exothermically welded, "Cadweld" or equivalent.

(7) The use of split-bolt clamps will be permitted in wireways at service entrance only. Torque to 55 foot-pounds or as recommended by manufacturer.

(8) No aluminum conductors shall be used.

3. INSTALLATION

A. The pulling of all wires and cable on this project shall be performed in strict compliance with applicable sections of the National Electrical Code. No conductor entering or leaving a cabinet or box shall be deflected in such a manner as to cause excess pressure on the conductor insulation. Conductors shall only be installed after insulating bushings are in place.

B. The radius of bending of conductors shall be not less than eighteen times the outside diameter of the conductor insulation or more, if recommended by the manufacturer.

C. Conductors installed within environmental air plenums shall be per N.E.C. Article 800 and other applicable codes, with FEP-type insulation or an approved equivalent. Also provide plenum-rated tie-wraps where plastic straps or other supports, etc., are installed in plenum areas.

D. Where indicated, communications conductors that are installed exposed shall not be routed across ceilings or ductwork. They shall be held up against building structure or against permanent support members. They shall be installed in such a manner that they do not interfere with the access to or operation of equipment or removal of ceiling tiles. Tie-wraps shall be installed in such a manner so as to bundle conductors neatly, allowing runouts of single conductors or groups to drop down to equipment served. Install grommeting where dropping out of trays or into panels or service columns. Install sleeves with bushings where penetrating partitions. Firestop sleeves with approved material. Do not penetrate firewalls if so indicated on plans. Refer to the drawings for support requirements and details on routing exposed communications conductors.

E. Conductors for isolated power systems shall be installed in as short a run of conduit as practicable. No pulling soap shall be used on conductors in isolated power systems.

F. Where conductors are installed in industrial facilities, they shall be per J.I.C. standards.

G. Maximum permissible pulling tensions, as recommended by the manufacturer for any given type of cable or wire installed shall not be exceeded. Utilize special remote readout equipment as required to ensure compliance. Use particular caution when installing twisted pair data cable or fiber optic cables -- forces permitted for pulling in are typically very low for these cable types.
H. All cables and wiring, regardless of voltage, installed in manholes or cable vaults shall be routed in such a manner to provide a minimum of 6 feet of slack cable for future splicing. Install cables along walls by utilizing the longer route from entry to exit. If both routes are symmetrical, provide a loop of cable secured to wall. All cables shall be tied to insulated cable supports on wall-mounted racks, spaced a maximum of three feet apart.

I. Where multiwire branch circuits are allowed, the phases and neutral shall be wire-tied together in the panelboard and in all pull boxes.

4. COLOR CODING DISTRIBUTION VOLTAGE CONDUCTORS, 600 VOLT OR LESS

A. Conductors to be color coded as follows:

(1) 120/208 Volt Conductors
   Phase A - Black
   Phase B - Red
   Phase C - Blue
   Neutral - Solid White or White with tracer stripe to match phase conductor

(2) Control Wiring - Red, or as indicated.

(3) Conductors within enclosures that may be energized when enclosure disconnect is off - yellow, or taped with 1/2" yellow tape every 6" of length, inside enclosure. Provide lamacoid plate warning sign on front of enclosure where this condition occurs.

(4) D.C. Wiring - Positive - Light Blue
    Negative - Dark Blue

5. COMMUNICATIONS CONDUCTORS

A. Communications conductors shall be of type suitable for the service, installed in accordance with the manufacturer's recommendations for pulling tensions, support, terminations, proximity to high power fields, etc. Types not indicated on this schedule but indicated on plans shall be as noted or required for the service. If in doubt, contact the Engineer for clarification.

B. Plenum-rated conductors (per N.E.C.) shall be installed where required by codes. If installation is thru an approved raceway system that excludes the wiring from the plenum, non-plenum type may be used.

C. All communications cables shall be furnished and installed in compliance with U.L. 444, U.L. 13, N.E.C. 800, 725, 760 and all applicable codes and standards, for premises or riser installations.

D. Riser cables shall be provided in accord with current edition of the N.E. Code.

E. Schedule of Wiring Types - Plenum-Rated
<table>
<thead>
<tr>
<th>Data Circuits</th>
<th>24 AWG, 4 Pair Certified Category Six augmented U.T.P. Plenum-Rated</th>
<th>Anixter #CMP-00424 FAS-5B Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice Circuits</td>
<td>24 AWG, 4 Pair Certified Category Six augmented U.T.P. Plenum-Rated</td>
<td>Anixter #CMP-00424 FAS-5B Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent</td>
</tr>
<tr>
<td>6-Strand Fiber (or # of Strands as Noted)</td>
<td>Multimode 50/125 Micron, Plenum-Rated</td>
<td>Anixter #370-COROM2-TBD-06 Superior Essex TE Connectivity Siecor Equivalent Berk-Tek Equivalent</td>
</tr>
</tbody>
</table>

END OF SECTION 260519
SECTION 260526 - GROUNDING

1. GENERAL

A. All metallic conduit, raceways, cable trays, wireways, supports, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code, as shown on the Contract Drawings and in accord with the requirements of the local authority having jurisdiction, as applicable.

B. The size of the equipment grounding conductors, grounding electrode conductors and service grounding conductors shall be not less than that given in Article No. 250 of the National Electrical Code, and/or as shown on the Contract Drawings. Where ungrounded conductor sizes are increased to minimize voltage drop, grounded conductor sizes shall be increased in the proper proportion.

C. Grounding bus and non-current carrying metallic parts of all equipment and raceway systems shall be securely grounded by connection to common ground.

D. The service entrance main ground bus shall also be connected to the main cold metallic water pipe within three feet of where it enters the building, on both the house and street sides of the main shut-off valve with a properly sized bonding jumper. A properly sized bonding jumper shall also be provided to the frame of any steel structure utilized in the construction. The steel frame of the building (if any) shall be made electrically continuous.

E. Provide new grounding system from telecommunications (LAN/TELCO Room) to main building ground bus. All telecommunication racks and raceways (conduits/tray) are to be bonded to ground.

2. MATERIALS

A. Ground wires and cables shall be of the AWG sizes shown on the Contract Drawings or shall be sized in accord with the prevailing codes. All ground wires and cables shall be copper.

B. All grounding fittings shall be heavy cast bronze or copper of the mechanical type except for underground installations or interconnection of grounding grid to cable, columns and ground electrodes, which shall be thermally welded type as manufactured by Cadweld, Burndy Co., Therm-O-Weld, or approved equivalent. Other bonding clamps or fittings in above ground locations shall be as manufactured by O.A. Co., T & B, Burndy, or approved equivalent.

C. Ground electrode pipe systems shall be solid copper construction. Ground rods shall be 5/8” minimum diameter, eight feet long, copperweld steel. All ground electrode systems shall be installed in accord with manufacturer’s recommendations, U.L. listings, National Electrical and National Electrical Safety Codes.

3. INSTALLATION

A. All grounding conductors shall be protected from mechanical injury and shall be rigidly supported. Where ground conductors are run through flexible conduit and through panelboard switchboard or motor control center feeders, they shall be securely bonded to such conduit thru the use of grounding bushings at the entrance and exit. All connection of equipment shall be made with an approved type of solderless connection and same shall be bolted or clamped to equipment or conduit.
B. All equipment grounding conductors to lighting fixtures, devices, receptacles, electric heaters, furnace and other equipment not exceeding No. 8 AWG in size shall be green colored Type "THWN".

C. Equipment ground connections to GFI circuit breakers shall be carried and bonded to each outlet on the circuit. Provide a separate equipment grounding conductor with green color insulation.

D. Resistance to the grounding at the service entrance equipment shall be in accordance with the N.E.C. for style of construction and shall not exceed ten ohms as measured by the described testing method.

E. All circuits shall have a separate grounding conductor, except as otherwise noted.

F. When grounding systems are completely installed and all grading in the area of the service grounding electrode has been completed up to finish elevations, perform a fall-of potential or other approved test to determine actual system resistance to earth. Report results to the Engineer in writing. Refer to testing provisions in this section of specifications.

G. Where separately-derived systems are utilized as part of the power distribution network, the neutral leg of the secondary side of generators, transformers, etc., shall be connected to a grounding electrode in accordance with the manufacturer's recommendations.

H. The Contractor shall ensure that the ground return path thru building structural steel or other means is electrically continuous back to the service grounding electrode and is of adequate capacity and impedance to carry the maximum expected fault or other current. Where no electrically continuous steel building frame is available, the Contractor shall provide a properly sized ground bar and ground conductor routed back to the main facility ground bus.

I. Where a building's steel frame is made electrically discontinuous by masonry breaks (as at firewalls, etc.), the Contractor shall provide an accessible thermically welded bonding jumper of #500MCM copper to bond the building steel frame sections together, making the entire steel frame electrically continuous. The installation of these bonding jumpers shall be reviewed by the Engineer prior to their being covered by construction.

J. Where lightning protection systems are utilized on the work, their electrodes and conductors shall be electrically segregated from the building service ground, except where connections to structural elements are required for the proper installation of these systems. Lightning protection grounds shall only be utilized for lightning grounding applications, in accord with U.L. and manufacturer's recommendations.

K. Grounding connections shall never be made to fire protection, natural gas, flammable gas or liquid fuel piping, except where specifically indicated on the plans.

L. Where dielectric fittings are utilized in piping systems, the piping system shall not be utilized as a ground path. Bonding jumpers shall not be utilized to bridge over such fittings. Piping systems shall not be utilized as ground paths except where specifically required by codes in the case of water piping.

4. GROUNDING ELECTRODE SYSTEM

A. The ground electrode system shall be as specified herein. The system shall not require maintenance throughout the expected life span of the materials.
B. Ground system shall be an electrolytic rod type, as manufactured by Lyncole XIT Grounding, Superior Grounding Systems, L.E.C., Inc. (Chem-Rod), or approved equivalent. Electrode(s) shall be placed as shown on the plans, installed exactly per manufacturer's recommendations. Electrodes shall be installed vertically, 12 feet of overall length (or length as indicated), set in a drilled hole and backfilled per manufacturer's instructions with a special clay slurry surrounding the rod. Provide a concrete protection box with cast iron grate for the top of the rod termination. Ground system shall be as follows:

1. Manufacturer: Lyncole XIT Grounding (or approved equivalent).
2. Source: Lyncole XIT Grounding, 22412 S. Normandie Ave., Torrance, CA 90502 1-800-962-2610
4. Shaft Length: 12 feet (or as otherwise indicated).
6. Material: Type K Copper.
8. Weight: 3.5 lbs. per foot of length, nominal.
9. Ground Wire Termination: Exothermic ("Cadweld" by Contractor) connection to 4/0 conductor, with U-bolt with pressure plate provided as test point.
10. Average Life Expectancy: 25 Years.
11. Model Number: K2-(length)CS.
12. Provide grounding system with the following components: protective box, backfill material. Box to be concrete with cast iron, tamper-resistant lid, backfill to be "Bentonite" clay.

C. Installation of Pipe Ground System

1. Pipe ground systems shall be installed exactly as required by the system manufacturer. The Contractor shall be diligent to observe the excavation, sealing tape removal, slurry backfill and all other critical requirements.

2. Note: NEVER USE SAND OR ORDINARY EARTH AS A BACKFILL MATERIAL

D. Pipe grounding system shall be warranted unconditionally by the Contractor for a period of one year from the date of substantial completion.

5. GROUND TESTING PROCEDURE

A. The actual resistance to earth of the service grounding electrode shall be measured by the Contractor via the fall-of-potential method. This testing shall be accomplished after the grounding electrode has been completely installed and the finished grade is achieved.

B. The results of the testing shall be summarized in a written report by the Contractor, which shall be forwarded to the Engineer for review. The report shall also be included with the operation and maintenance manuals for the Owner's information and future reference. This report is to also contain a detailed description and illustrations of the testing procedure, along with the name and model number of the testing instrument(s).

C. For the actual testing, the Contractor shall follow the procedures outlined below. A self-contained instrument such as a "Megger" or "Ground OHMMETER" shall be used that is designed to eliminate the influence of stray current effects on the accuracy of the measurements.
(1) Connect one side of the instrument to the grounding electrode conductor where it connects to the facility main ground bus (point C1). Disconnect and isolate the grounding electrode conductor for the test.

(2) Drive a copperweld reference electrode probe (point C2) into earth between 300 and 500 feet away from C1 and connect to measurement instrument.

(3) Drive the movable grounding probe (C3) into earth at ten equally spaced intervals, in a straight line between C1 and C2 points and note the E/I=R resistance readings on a graph at each point.

(4) The resistance measurements in OHMS taken from the flat part of the curve shall be averaged to determine the true grounding electrode resistance to earth.

(5) At completion of testing, remove reference electrode C2 and all temporary wiring and connections.

(6) If actual measurements of grounding electrode indicate a resistance greater than five OHMS, contact the Engineer for instructions. If deemed necessary by the Engineer, additional electrodes shall be placed and the measurement process repeated until the desired ground potential achieved.
SECTION 260531 - CABINETS, OUTLET BOXES AND PULL BOXES

1. GENERAL

A. This section of the specifications covers all electrical cabinets, outlet boxes and pull boxes.

B. Continuous runs of conduit shall have properly sized pull boxes at least each eighty-five feet of run, or as near as possible to that limit.

2. MATERIALS & INSTALLATION

A. Cabinets, Outlet and Pull Boxes:

(1) Cabinets for lighting and power, telephone, pull boxes, outlet boxes, or any other purposes specified or shown on the Contract Drawings, shall be constructed of code gauge, galvanized steel with sides formed and corner seams riveted or welded before galvanizing. Boxes assembled with sheet metal screws will not be accepted. Pull boxes shall include all boxes used to reduce the run of conduit to the required number of feet or bends, supports, taps, troughs, and similar applications and shall also be constructed as specified above.

(2) All cabinets and boxes for NEMA 1 and 1A application shall be provided with knockouts, as necessary, or shall be cut in the field by approved cutting tools which will provide a clean, symmetrically cut opening. All boxes, except panelboards, shall be provided with code gauge fronts with hex head or pan head screw fasteners. Outdoor cabinets shall be hinged cover with pad locking provisions. Fronts for panelboards shall be as specified for panelboards.

(3) Ceiling outlet boxes shall be galvanized steel, 4" octagonal, not less than 2 1/8" deep, with lugs or ears to secure covers. Those for use with ceiling lighting fixtures shall be fitted with 3/8" fixture studs fastened to the back of the boxes, where applicable. Provide adequate support with at least a 2 x safety factor for the anticipated fixture weight.

(4) Special size concealed outlet boxes for clocks, speakers, alarms, panels, etc., shall be provided by the manufacturer of the equipment.

(5) Floor outlet boxes shall be as specified in Section 262726, fully adjustable unless noted or specified otherwise.

(6) Unless otherwise noted on the drawings or in the specifications, outlet boxes shall be installed at the following heights to centerline of box:

- Wall Switches, Control Stations .......................................................... 3'-10"
- Convenience Outlets .......................................................... 1'-6"
- Convenience Outlets - Above Counters.......................... Bottom at 2" above top of backsplash
- T.V. Outlets .......................................................... 1'-6"
- T.V. Outlets - At Wall Brackets .......................................................... 7' - 2"
- Desk Telephones .......................................................... 1'-6"
Wall-Mounted Telephone ....................................................................................................4'-6"
Weatherproof Outlets ...........................................................................................................2'-2"
Disconnects, Branch Panelboards ..........................................................5'-0" max. to centerline
Fire Alarm Manual Stations ...............................................................................................3'-10"
Fire Alarm Audio and/or Visual Units80" AFF to bottom of device or 6" below ceiling, whichever is lower.

(7) The location of outlets, as shown on the drawings, shall be considered as approximate only. It shall be incumbent upon this Contractor to study the general building drawings, with relation to spaces surrounding each outlet, in order to make his work fit the work of others and in order that when the devices or fixtures are installed, they will be symmetrically located and will not interfere with any other work or equipment. Any change in fixture or layout shall be coordinated with and approved by the Engineer before this change is made. Regardless of the orientation shown on the drawings, all devices shall be easily accessible when installed.

(8) Boxes installed in fire rated assemblies shall not compromise the rating of the assembly. The Contractor is responsible for identifying assembly ratings and construction requirements prior to rough-in.

   a. Listed single and double gang metallic outlet and switch boxes with metallic or nonmetallic cover plates may be used in bearing and nonbearing wood stud and steel stud walls with rating not exceeding 2 h. The boxes shall be fastened to the studs with the openings in the wallboard facing cut so that the clearance between the boxes and the wallboard do not exceed 1/8 in. The boxes shall be installed so that the surface area of individual boxes do not exceed 16 sq in, and the aggregate surface area of the boxes do not exceed 100 sq in per 100 sq ft of wall surface unless approved alternate protection materials are used.

   b. Boxes located on opposite sides of walls or partitions shall be separated by a minimum horizontal distance of 24 in. This minimum separation distance between the boxes may be reduced when listed Wall Opening Protective Materials are installed according to the requirements of their Classification.

   c. Boxes installed on opposite sides of walls or partitions of staggered stud construction shall have listed Wall Opening Protective Materials installed with the boxes in accordance with Classification requirements for the protective materials.

   d. All installation shall be done in accordance with AHJ requirements.

(9) All outlets, pull boxes, junction boxes, cabinets, etc., shall be sized per the current edition of the National Electrical Code.

B. Cabinets, outlet boxes and junction or pull boxes shall be threaded for rigid-threaded conduit, dust-tight, vapor-tight or weatherproof as required for areas other than for NEMA 1 or 1A application. These shall be as manufactured by Crouse-Hinds, Appleton, Killark, or approved equivalent.
(1) NEMA 1 or 1A cabinets, outlet boxes or pull or junction boxes shall be as manufactured by Appleton, Steel City, T & B, or approved equivalent.

(2) Outlet boxes for switches, receptacles, telephone, etc., concealed in walls shall be galvanized steel, 2" X 4" X 2" with plaster cover for the number of devices as required. Where outlet boxes are installed in walls of glazed tile, brick, concrete block, or other masonry which will not be covered with plaster or in walls covered by wood wainscot or paneling, deep sectional masonry boxes shall be used and they shall be completely covered with the plates or lighting fixtures. This Contractor shall cooperate with the brick layers, block layers and carpenters to insure that the outlet boxes are installed straight and snugly in the walls. Receptacles shall be set vertically in walls, unless noted otherwise.

(3) Outlet boxes mounted in glazed tile, brick, concrete block or other types of masonry walls shall be mounted above or below the mortar joint. Do Not Split The Mortar Joint.

(4) Boxes for more than two devices shall be for the number of devices required and shall be one piece. No ganging of single switch boxes will be allowed.

(5) Outlets provided shall have only the holes necessary to accommodate the conduit at the point of installation and shall be rigidly secure in position. Boxes with knockouts removed and openings not used shall be replaced or be provided with a listed knockout closure.

(6) Openings for conduit entrance in cabinets and boxes shall be prefabricated, punched, drilled and/or reamed. The use of a cutting torch for this purpose is prohibited.
1. GENERAL

A. This section is intended to specify the raceways, conduit, conduit fittings, hangers, junction boxes, splice boxes, specialties and related items necessary to complete the work as shown on the drawings and specified herein.

B. This section specifies basic materials and methods and is a part of each Division 26, 27 and 28 that implies or refers to electrical raceways specified therein.

C. The types of raceways specified in this section include the following:

   (1) Steel electrical metallic tubing. (E.M.T.)
   (2) Rigid galvanized steel conduit. (G.R.S.)
   (3) Rigid aluminum conduit.
   (4) Flexible metal conduit (aluminum or steel)
   (5) Liquid - tight flexible metal conduit.
   (6) Rigid nonmetallic conduit.
   (7) Surface metal raceways.
   (8) Wireways, wall ducts and trench ducts.
   (9) Cable tray or cable trough.

D. All raceways, as listed in 1C. above and otherwise specified herein shall be provided in compliance with latest editions of all applicable U.L., NEMA, N.E.C. and A.N.S.I. standards. All conduit, raceways and fittings shall be Underwriters Laboratories listed and labeled, or bear the listing of an agency acceptable to the local authority having jurisdiction.

E. Conduit and raceways, as well as supporting inserts in contact with or enclosed in concrete shall comply with the latest edition of all A.C.I. standards and the equipment manufacturer's recommendations for such work.

F. P.V.C. or other non-metallic conduit shall be rated for the maximum operating temperature that could be developed by the conductors it encloses, while in normal operation.

G. The decision of the Engineer shall be final and binding in any case where a question or inquiry arises regarding the suitability of a particular installation or application of raceways, supports or materials, if other than outlined herein.

H. Minimum size of conduit shall be 3/4" trade size. All conduit and raceways shall be sized for the number of conductors contained, in accord with the latest edition of the National Electrical Code or any other applicable standards.

I. The installer of raceway systems shall avoid the use of dissimilar metals within raceway installations that would result in galvanic-action corrosion.

2. MATERIALS

A. STEEL ELECTRICAL METALLIC TUBING

   (1) Electrical metallic tubing, (E.M.T.) of corrosion-resistant steel construction shall be permitted for concealed installation in dry interior locations. Electrical metallic tubing shall not be installed in concrete slabs or where exposed to physical damage. Electrical metallic tubing
shall be permitted for exposed work in mechanical and electrical rooms and other exposed structure areas where not subjected to physical damage, as determined by the Engineer.

B. RIGID GALVANIZED STEEL CONDUIT

(1) Rigid galvanized steel conduit shall be used where subject to physical damage for exposed work in mechanical spaces, within factory or other industrial work areas, for exposed fit-up work on machinery, for exposed exterior damp or wet location work, in hazardous atmospheres, in exterior underground locations where installed beneath roadways, where ells occur in underground P.V.C. conduits, or where turning out of concrete encased duct banks, and at other locations as specifically called out on the drawings.

(2) Rigid galvanized steel conduit shall be used for all building interior power wiring or cables of over 600 Volts.

C. RIGID ALUMINUM CONDUIT

(1) Rigid aluminum conduit, shall be permitted for installation indoors in dry locations only. Under no conditions shall it be cast into concrete slabs or pass thru construction where prolonged contact will degrade the aluminum. All ells used in rigid aluminum conduit systems shall be rigid galvanized steel. Rigid aluminum conduit shall always be used for power wiring greater than 5 KVA and higher than 60 Hz frequency.

D. FLEXIBLE METAL CONDUIT

(1) Flexible conduit shall be used where permitted by NEC. It may be constructed of aluminum or steel. It shall be installed with connectors designed for the purpose. All flexible metal conduit shall be installed as a single piece. No joints shall be installed. Flexible conduit shall not be used in wet or dusty locations or where exposed to oil, water or other damaging environments. An equipment grounding conductor or bonding jumper shall be used at all flexible conduit installations. Maximum permitted length of flexible metal conduit shall be 72”, for light fixture whips or unless approved in writing by Engineer.

E. LIQUIDTIGHT FLEXIBLE METAL CONDUIT

(1) Weatherproof flexible metal conduit shall be wound from a single strip of steel, neoprene covered, equivalent to "Liquatite" or "Sealtite" Type "UA". It shall be installed in such a manner that it will not tend to pull away from the connectors. Provide strain relief fittings equivalent to "Kellems" as required where subject to vibration. Flexible connections to motors in dusty areas shall be dust-tight, in areas exposed to the weather - weatherproof.

F. RIGID NON-METALLIC CONDUIT

(1) Rigid non metallic conduit shall be constructed of P.V.C, nominally schedule 40 weight, except where encased in concrete, where it may be "EB" type. If installation will enclose utility company provided conductors, verify exact type required and install in accord with their standards, if more stringent than this specification.

(2) Rigid non-metallic conduit may be used in exterior wet or damp locations where installed underslab or underground. It shall not be run in interior locations, except with special permission from the Engineer for use in corrosive environments, and then only if protected from physical damage. No rigid nonmetallic conduit may be installed in environmental air
plenums or cast into above-grade concrete slabs. No rigid nonmetallic conduit may be installed in locations where the ambient temperature might exceed the rating of the raceway.

(3) Where rigid nonmetallic conduit is placed underground, as for feeder circuits, secondaries or branch circuit runs and where ell is made upward thru a slab on grade, transition the turning ell and the riser to rigid steel conduit to a height of 6" above the concrete slab. Transition may then be made to E.M.T or other approved conduit for remainder of run.

(4) Flexible nonmetallic conduit shall not be used, except by special permission, obtained in writing from the Engineer.

(5) Provide equipment grounding conductors of copper, sized as required by codes, in all circuits installed in rigid nonmetallic raceways.

G. SURFACE METAL RACEWAYS

(1) Surface metal raceways shall be constructed of code gauge corrosion-resistant galvanized steel or aluminum extrusions, and finished in an ivory, buff or grey color as selected by the Architect. Finishes shall be suitable for field painting, prepared by the installing contractor as necessary.

(2) Surface metal raceways, where used as raceways only, shall be sized for the conductors indicated. Nominal minimum size of such raceways shall be equivalent to Wiremold Co. Series #700, or equivalent by Isotrol or other approved manufacturer.

(3) Surface metal raceways to be furnished with integral receptacles shall have Simplex Nema 5-20R outlets spaced on centers as indicated on plans. These shall be Wiremold Co. #2200 Series or equivalent Isotrol or other approved manufacturer.

(4) Surface metal raceways and all components and fittings shall be furnished by a single manufacturer, wherever practical. All trim and cover fittings, flush feed boxes, splices, outlet fittings, etc, necessary for a complete installation shall be provided by the installing contractor. These raceways shall be rigidly mounted with approved fasteners on not to exceed 24" centers in a run, or 6" from ends and on either side of a corner. Refer to plans for notations on exact types of these raceways and outlet configurations.

H. WIREWAYS, WALL DUCT, FLUSH FLOOR TRENCH DUCT

(1) WIREWAYS

a. Wireways of painted steel construction shall be corrosion-resistant, moisture and oil resistant where indicated or necessary. Wireways shall be furnished in nominal sizes of 2 1/2" X 2 1/2", 4" X 4", 6" X 6", 8" X 8" or 12" X 12", as indicated on plans. Furnish with hinged covers on all runs and removable covers on all fittings, to allow a continuous unobstructed path for conductor installation. Provide knockouts on all runs, unless otherwise indicated or prohibited by codes.

b. Provide wireways with hangers of same manufacturer, installed so as to allow unobstructed access to wireway interior. Install at not to exceed 8'-0" centers, closer as needed at fittings and turns. Use 1/4" rod hangers minimum for up to 4"X4", 3/8" rod minimum up to 8"X8", 1/2" rod minimum for 12" X 12".
c. Wireways shall be equivalent to Square “D” Co. “LD” series, as a minimum standard of construction and quality.

I. OPEN WIRE MESH CABLETRAY

(1) Section includes continuous, rigid, welded steel wire mesh cable management system.

(2) References
   b. ASTM A 510 - General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.
   c. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.

(3) Design Requirements

(4) Submittals
   a. Product Data: Submit manufacturer’s product data, including UL classification.
   b. Shop Drawings: Submit shop drawings indicating materials, finish, dimensions, and accessories. Show layout, support, and installation details.
   c. Manufacturer Qualifications: Submit manufacturer’s certification indicating ISO 9002 quality certified.

(5) Delivery, Storage and Handling
   a. Delivery: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
   b. Storage: Store materials in a dry area indoors, protected from damage, and in accordance with manufacturer’s instructions.
   c. Handling: Protect materials and finishes during handling and installation to prevent damage.

(6) Manufacturer
   a. Cablofil, Inc., 8319 State Route 4, Mascoutah, IL, 62258. Phone (618) 566-3230. Toll Free (800) 658-4641. Fax (618) 566-3250. www.cablofil.com, or approved equivalent. Part numbers included in this section are not meant to restrict truly equivalent manufacturers.

(7) Open Wire Mesh Cabletray System
   a. Description: Continuous, rigid, welded steel wire mesh cable management system.
1) Mesh System: Permitting continuous ventilation of cables and maximum dissipation of heat.

2) Safety Edge: Continuous safety edge T-welded wire lip.

3) Wire Mesh: Welded at all intersections.

b. UL Classification: Straight sections 4" x 8", 12", and 18 inches.

c. Material: Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, bent, and surface treated after manufacture.

d. Finish for Carbon Steel Wire: Finish applied after welding and bending of mesh.

1) Hot-Dip Galvanizing: ASTM A 123. (Only in exterior, wet or corrosive locations)

2) Flat Black: Powder painted surface treatment using ASA 61 black polyester coating. (In indoor dry locations)

e. Nominal Dimensions:

1) Nominal Mesh: 2 x 4 inches.

2) Nominal Straight Section Lengths: 80 inches and 118 inches.

3) Width: [6 inches] [8 inches] [12 inches] [18 inches] [24 inches].

4) Depth: Four inches in depth for all but 6" wide, which shall be 2" depth.

5) Wire Diameter: Nominal .177 inch, minimum.

f. Fittings: Field fabricated in accordance with manufacturer's instructions from straight sections.

g. Support System: Standard.

1) Wall Installation: CS Bracket. Maximum tray width of 12 inches (300 mm).

2) Trapeze Mounting to Ceilings: CS Profile. Maximum tray width of 18 inches (450 mm).

3) Ceiling Installation: CSC Bracket. Maximum tray width of 12 inches (300 mm).

4) Fasteners: As required by tray widths. To be furnished by manufacturer.

h. Hardware: Hardware, including splice connectors, grounding fittings and support components to be furnished by the manufacturer.

i. Grounding: GTA-2-2 grounding lugs for attachment on tray of continuous ground conductor fixing system.

(8) Examination
a. Examine areas to receive cable management system. Notify the Engineer of conditions that would adversely affect the installation or subsequent utilization of the system. Do not proceed with installation until unsatisfactory conditions are corrected.

(9) Installation

a. Install open wire mesh cabletray system at locations indicated on the drawings and in accordance with manufacturer's instructions.

b. Load Span Criteria: Install open wire mesh cabletray system in accordance with span load criteria of L/240.

c. Cutting:
   1) Cut wires in accordance with manufacturer's instructions.
   2) Cut wires with side action bolt cutters to ensure integrity of galvanic protective layer.
   3) Cut each wire with 1 clean cut to eliminate grinding or touch-up.

d. Install open wire mesh cabletray system using hardware, splice connectors, support components, and accessories furnished by manufacturer.

e. Coordinate with other trades to provide as straight and accessible runs as possible. Not all offsets are shown on drawings, but Contractor shall make accessible offsets as required around ductwork, structure, piping or other interferences as required.

J. RACEWAY FITTINGS

(1) Raceway fittings (or condulets) shall be of gray iron, malleable iron or heavy copper-free cast aluminum. They shall be furnished in proper configurations, avoiding excessive plugged openings. Any openings that are left shall be properly plugged. All coverplates shall be gasketed with neoprene or similar approved materials, rated for the environment.

(2) Where required, raceway fittings shall be provided in explosion-proof configurations rated for the atmosphere. Place conduit seal off fittings at each device in accord with applicable codes. Seal off fittings shall be packed with wadding, and poured with an approved non-shrink sealing compound.

(3) Where conduit transitions in a run from a cold to a warm environment, (such as at a freezer, refrigerator or exterior wall) sealoff fittings shall be placed on the warm side immediately at the boundary to prevent migration of condensation within raceway systems.

(4) Expansion fittings shall be provided at all locations where conduits or other raceways cross over expansion joints. Provide copper ground bonding jumpers across expansion fittings.

(5) Conduit bodies, junction boxes and fittings shall be dust tight and threaded for dusty areas, weatherproof for exterior locations and vapor tight for damp areas. Conduit fittings shall be as manufactured by Crouse Hinds, Appleton, Killark or approved equivalent. All surface mounted conduit fittings as with "FS", "FD", "GUB" Types etc., shall be provided with mounting hubs.

(6) Where lighting fixtures, appliances or wiring devices are to be suspended from ceiling outlet boxes, they shall be provided with 3/4" rigid conduit pendants. Outlet boxes shall be malleable.
iron, provided with self-aligning covers with swivel ball joint and No. 14 gauge steel locking ring. Provide safety chain between building structure and ballast housing of light fixtures for all fixtures, appliances or devices greater than 10 lbs weight. Fixtures shall be installed plumb and level.

(7) Fittings for threaded raceways shall be tapered thread with all burrs removed, reamed ends and cutting oil wiped clean.

(8) Fittings for E.M.T. conduit shall be of the compression type. Conduit stops shall be formed in center of couplings. All EMT connectors and couplings shall be of formed steel construction.

(9) Indentation or die-cast fittings shall not be permitted in any raceway system.

(10) All conduit fittings shall be securely tightened. All threaded fittings shall be engaged seven full threads. Fasteners shall be properly torqued to manufacturer's recommendations.

K. SUPPORTS AND HANGERS

(1) Supports and hangers shall be installed in accord with all applicable codes and standards. They shall be corrosion - resistant, galvanized or furnished with an equivalent protective coating. All electrical raceways shall be hung independently from the building structure with U.L. listed and approved materials. Hangers and supports depending on the support systems of other trades' work shall not be permitted, except with specific approval in writing from the Engineer. The use of tie wire for support or fastening of any raceway system is prohibited. Perforated metal tape shall not be used for raceway support.

(2) No raceway shall be installed on acoustic tile ceiling tees, or in any location that will impair the functioning, access or code-required clearances for any equipment or system.

(3) Supports for raceways shall be of materials compatible with the raceway, of malleable iron, spring steel, stamped steel or other approved material. Die-cast fittings are not permitted for supports.

(4) The installing contractor shall provide all necessary supports and braces for raceways, in a rigid and safe installation, complying with all applicable codes.

(5) Individual conduits run on building walls or equipment shall be secured by one hole galvanized malleable iron or stamped steel pipe strap or "minerallac" 2-piece straps. The straps are to be anchored by an approved means such as expansion anchors, toggle bolts, through bolts, etc. Where required by codes or other standards, provide spacers behind mounting clamps to space conduits off walls.

(6) Individual conduits run on building steel shall be secured by means of clamp supports similar and equal to those manufactured by the C.C. Korn Company, Elcen Co., B-Line or approved equivalent. Provide korn clamps, bulb tee clamps, flange clamps, beam clamps, "minerallacs", etc.

(7) Where feasible, vertical and/or horizontal runs of conduit shall be grouped in common hangers on "trapezes" of channel stock as manufactured by "Unistrut" or equivalent, 1-5/8" minimum depth, 12 gauge. Utilize conduit clamps appropriate to the channel.

(8) Channel strut systems for supporting electrical equipment or raceways in outdoor wet or corrosive locations shall be constructed of 12 gauge minimum hot dip galvanized steel with
9/16" diameter holes on 8" centers, with finish coat of paint as manufactured by Unistrut, B-Line, Kindorf, or approved equivalent. In indoor dry locations, factory finish paint will be acceptable.

(9) The minimum diameter of round all-thread steel rods used for hangers and supports shall be 1/4", 20 threads per inch. All-thread rod shall be furnished with a corrosion-resistant finish.

(10) Welding directly on conduit or fittings is not permitted.

(11) Provide riser support clamps for vertical conduit runs. Riser support clamps shall be of heavy gauge steel construction. Install riser support clamps at each floor level penetration, or as otherwise required.

(12) Provide conduit cable support clamps for vertical conductor runs as required or indicated on plans. Clamps to be insulating wedging plug, with malleable iron support ring. Install within properly sized and anchored junction box.

(13) Spring steel clips and fittings such as those manufactured by HITT-Thomas, Caddy-Erico, or approved equivalent, with black oxide finish are permitted in any indoor dry location for concealed work, where acceptable to the local authority having jurisdiction.

3. INSTALLATION

A. This Contractor shall lay out and install all conduit systems so as to avoid any other service or systems, the proximity of which may prove injurious to the conduit, or conductors which it confines. All conduit systems, except those otherwise specifically shown to the contrary, shall be concealed in the building construction or run above ceilings. Size of all conduit shall as a minimum conform to the National Electrical Code, unless larger size is indicated on the Contract Drawings.

B. No conduit larger shall be installed in poured concrete slabs except with permission of the structural engineer. All other shall be held below slab. Conduit shall be held at least 6" from flues or hot water pipes.

C. All exposed conduit shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of cast metal fittings or symmetrical bends unless otherwise shown. All conduit shall have supports spaced not more than eight feet apart.

D. Conduit shall be installed in such a manner so as to insure against collection of trapped condensation. All runs of conduit shall be arranged so as to be devoid of traps. Trapped conduit runs shall be provided with explosion proof drains at low points. Runs of conduit between junctions shall not have more than the equivalent of three 90º bends.

E. Junction boxes shall be installed so that conduit runs will not exceed 85', as shown on the Contract Drawings.

F. Underground electric, cable TV, telephone service or other rigid steel conduit and underfloor rigid steel conduit below the concrete floor slab shall be painted with two coats of bitumastic paint, such as "Asphaltum".

G. All underground or underfloor conduits shall be swabbed free of all moisture and debris before conductors are pulled.
H. At least two 1 inch and four 3/4 inch conduits shall be stubbed from flush-mounted panelboards into the nearest accessible area for future use. Provide suitable closures for these stubs. Identify each stub with a suitable hang tag.

I. Install electrical raceways in accordance with manufacturer’s written instructions, applicable requirements of latest edition of the N.E.C., and NECA “Standard of Installation”, complying with recognized industry practices.

J. Coordinate with other trades, including metal and concrete deck trades, as necessary to interface installation of electrical raceways and components.

K. Level and square raceway runs, and install at proper elevations and required heights. Hold tight to structure or route through joists webbing wherever possible, to maximize available space and not restrict other trades.

L. Complete installation of electrical raceways before starting installation of cables or wires within raceways.

M. All underground conduits shall be buried to minimum depth of 24” from the top of the concrete encasement or raceway to finished grade, unless otherwise noted on plans. Observe minimum burial requirements of local utility company where their standards or regulations apply. Conduits containing primary power conductors, (higher than 600 volts to ground) shall be 42” to top below finished grade, unless otherwise noted on plans.

N. All raceways shall be installed to maintain a minimum of 4” clearance below roof decking.

4. SPECIALTIES

A. All EMT terminations at junction boxes, panels, etc. shall be made with case hardened locknuts and appropriate fittings, with insulated throat liners. Insulating terminations shall be manufactured as a single unit. The use of split sleeve insulators is not permitted.

B. All rigid conduit, except main and branch feeders, shall have heavy fiber insulating bushings reinforced with double locknuts. All branch and main feeders shall have insulated bushings with grounding lugs and shall be bonded to enclosures with appropriately sized copper jumpers, except at pad mounted transformers. Bonding jumpers shall be installed as required by the N.E.C. and other applicable codes.

C. All conduit stubbed through floor during construction shall have openings protected with plastic caps approved for this purpose. Connections on both ends of all flexible conduit shall be equivalent to Thomas and Betts, Ideal, Appleton, Efcor, or approved equivalent, rated for the environment.

D. All pulling lines left in open conduit systems shall be non-metallic, left securely tied off at each end.

E. Where spare raceways terminate in switchboards or motor control centers a fishtape barrier shall be provided.

END OF SECTION 260533
SECTION 260553 - IDENTIFICATIONS

1. GENERAL

   A. Equipment, disconnect switches, motor starters, pushbutton stations, special device plates, and similar materials shall be clearly marked as to their function and use. Markings shall be applied neatly and conspicuously to the front of each item of equipment with 1/2" white lamacoid plate (or equivalent) with black letters 1/4" high.

   B. The Contractor shall provide clearly legible typewritten directories in each electrical panel indicating the area, item of equipment, etc., controlled by each switch, breaker, fuse, etc. These directories are to be inserted into plastic card holders in each panel. The Contractor shall be required to demonstrate the accuracy of the panel directory for a random sampling of circuits in each panelboard as directed in the field by the Engineer with corrections made immediately so it is imperative that care be taken during installation to insure 100% accurate directories.

   C. Branch circuit panelboards and switch gear shall be provided with a white lamacoid plastic plate with 1/2" black letters for panel designation and 1/4" black letters showing voltage and feeder information. Branch circuit switches shall be designated as to function. Panelboard and switchgear labels shall indicate the source they are fed from, and the circuit number at that source. Panelboards shall also indicate color coding of the branch circuit phase conductors supplied. Clearly indicate the exact label legend to be furnished with each panelboard and switchgear on the shop drawings for each item of equipment prior to submission of shop drawings.

   EXAMPLE:

   
   
   PANEL “XYZ”
   FED FROM “MDP – 2”
   120/208/3PH/4W – 225A
   BLACK-RED-BLUE
   CONDUCTORS

   D. Where branch circuit panelboards and switchgear are connected to an emergency source, the lamacoid plate shall be red, and the word "emergency" shall be incorporated into the legend. In healthcare applications, the NEC – designated branch (life safety, critical or equipment branch) shall also be incorporated into the legend, all in ¼” letters. Also provide similar plates and legends for automatic transfer switches, and equipment disconnects 100 amps and larger.

   E. Lamacoid plates shall be located at center of top of trim for branch circuit panels, switch gear, and centered at side for branch circuit switches. Fasten with self-tapping stainless steel screws or other approved method.

   F. The building service disconnect(s) shall be marked with the maximum available fault current available at that location in accordance with NEC Article 110. If a fault current study is not required by this contract, the Contractor shall obtain fault current availability data from the utility company. This requirement applies to both new and existing services if any distribution equipment is changed.

END OF SECTION 260553
SECTION 262400 - ELECTRICAL DISTRIBUTION EQUIPMENT

1. GENERAL

A. All electrical distribution equipment shall be dead front UL listed for the purpose and application. All equipment shall meet or exceed all applicable requirements of the National Electrical Code (N.E.C.). Any device or component, i.e., switchboard, panel, breaker, switch, etc., used as service entrance equipment, shall be listed for use at 100% of the rated capacity.

2. MAIN SWITCHBOARD - CIRCUIT BREAKER STYLE

A. Switchboard shall be dead front, totally enclosed, free standing or wall mounted, as required or herein specified, housing the equipment as indicated. The switchboard shall meet Underwriters' Laboratories enclosure requirements, and be furnished with an Underwriters' Laboratories label. The entire switchboard is to be Square D I-Line or equivalent construction, G.E., Siemens, Eaton / Cutler - Hammer or approved equivalent. Where switchboards are floor-mounted, provide concrete housekeeping pad, 3” high, with #4 rebar on 6” X 6” centers, per A.C.I. standards. Chamfer edges of pad 1/2”.

B. The switchboard shall be dead-front with front accessibility. The switchboard framework shall consist of steel channels bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting. The framework is to be formed of code gauge steel, rigidly welded together to support all cover plate, bussing and component devices. All unused positions shall have closures.

C. Each switchboard section shall have an open bottom (closed for wall-mounted style) and a top plate for installation and termination of conduit. Top and bottom conduit areas are to be clearly shown and dimensioned on the shop drawings. The wireway front covers shall be secured by screws and hinged, to permit access to the branch circuit breaker load side terminals. The paint finish shall be medium light gray, per ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment. Enclosure shall be NEMA 1, with drip shield on top. Provide top covers without knockouts. All conduit entries to be field cut. At top conduit entries, provide weatherproof sealing lock nuts on terminator.

D. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 on temperature rise. Main and/or through busses shall be 100% annealed copper. The through bus shall have an ampacity in amperes as indicated on the drawings and shall be braced to have a short circuit current rating of 100,000 RMS symmetrical amperes unless otherwise indicated. (Where through bus is provided, it shall have provisions for the addition of future sections on the branch or distribution side.) The through bus supports, connections and joints are to be bolted with hex head bolts and belleville washers to minimize maintenance requirements.

E. Neutral bussing shall be of the same ampacity bussing and insulated from the enclosure. Ground bussing shall be sized and shall be bonded to the enclosure per N.E.C., current edition. Service grounding electrode connection shall be made between ground and neutral busses. Provide ground bushings and equipment ground conductor connection on each feeder conduit leaving switchboard and at the terminal end for each continuous metallic feeder conduit.

F. Each switchboard, as a complete unit, shall be given a single short circuit current rating by the manufacturer. Such a rating shall be established by actual tests by the manufacturer, in accordance with UL specifications, on equipment constructed similarly to the subject switchboard.
G. The service disconnect device(s) shall be thermal-magnetic molded case circuit breaker(s) installed totally front accessible and front connectable. Line side of branch circuit breaker connections are to be jaw type plug-on. Ground fault protection shall be provided as required by N.E.C. Article 230-95, where switchboard is rated for 277/480 volts and circuit breaker frame sizes are 1000 amperes or greater, regardless of trip setting.

H. Group mounted molded case circuit breakers for branch distribution are to be totally front accessible. These circuit breakers are to be mounted in the switchboard to permit installation, maintenance and testing without reaching over any line side bussing. All line and load side connections are to be individual to each circuit breaker. Common mounting brackets or electrical bus connectors will not be acceptable. Line side circuit breaker connections are to be jaw type plug-on, arranged to withstand the anticipated fault currents.

I. Each circuit breaker is to be furnished with an externally operable mechanical means to trip the circuit breaker, enabling maintenance personnel to verify the ability of the circuit breaker trip mechanism to operate as well as exercise the circuit breaker operating mechanisms.

J. Include kw, kwh, voltage, amperage metering per phase along with appropriate digital output to interface with campus DDC control system for remote monitoring of power system. Coordinate with controls supplier for a 100% complete installation.

K. All circuit breakers shall have a minimum ISCA rating of 65,000 amps, A.I.C., unless otherwise noted on the One-Line Diagram.

L. Arc Flash Hazard warning labels shall be affixed to all switchboards in accordance with Article 110.16 of the National Electrical Code.

M. Switchboard shall be Square "D", G.E., Siemens, Eaton/Cutler–Hammer or approved equivalent.

N. Lockable breakers shall be provided for all breakers serving all HVAC equipment, Plumbing equipment, and kitchen appliances.

3. BRANCH PANELBOARDS

A. This section covers lighting and power panelboards (refer to schedules, notes on Drawings and the Electrical One-Line Diagram, of the Contract Drawings).

B. All panelboards shall be of the circuit breaker type, and shall be of one manufacturer.

C. Branch panelboards shall be as indicated on the drawings and as specified herein. The lighting panelboards shall be of the dead-front, quick-make, quick-break, plug-in circuit breaker type, with trip indicating and trip free handles. All circuits shall be clearly and properly numbered and shall be provided with thermal magnetic protection. The panelboards shall be enclosed in code gauge, galvanized steel cabinets with smooth finished hinged doors without visible external fasteners and heavy chrome locks. Locks shall all be keyed alike. Each door shall have a directory card inside, covered with a plastic shield, filled in with black india ink or typewritten with circuit numbers and description indicated. Room numbers shall be coordinated with final room numbers as selected by Owner -- not numbers on Contract Documents.

Special Note: The room numbers used to fill out the panel directories shall match the actual final name and numbering scheme selected by the Owner. They shall not be filled out per the construction drawing numbering scheme, unless the Contractor is directed to do so by the Architect or Engineer.
D. Branch panelboards shall be surface or flush mounted as indicated on the Contract Drawings.

E. Circuit breakers for 120/208 volt systems shall be of 10,000 A.I.C. RMS symmetrical rating unless otherwise indicated on the Contract Drawings. For 277/480 volt systems, provide circuit breakers with 14,000 A.I.C. ratings unless otherwise indicated.

F. All main bus and connections thereto in branch panelboards shall be copper. All bus bars shall extend full length of panelboards.

G. All circuit breakers used to switch lights shall be SWD (switching duty) rated and U.L. listed for the purpose.

H. Where required by the National Electrical Code, provide branch arc-fault circuit interrupters (A.F.C.I.’s) in branch panelboards, whether indicated on the panel schedule or not. They shall be U.L. listed, latest edition.

I. Where branch circuit breakers feed hermetically, sealed compressor for cooling or refrigeration equipment, provide U.L. listed H.A.C.R.-style circuit breakers.

J. Where branch circuit breakers are indicated or required to be ground-fault circuit-interrupting type (G.F.C.I.), they shall have test and reset buttons and be U.L. listed, latest edition. Do not share neutrals with other circuits.

K. Where branch circuit breakers are feeding H.I.D. (high-intensity-discharge) loads, they shall be rated and listed for such loads. Provide proper circuit breaker whether indicated on panel schedules or not.

L. Arc Flash Hazard warning labels shall be affixed to all panelboards in accordance with Article 110.16 of the National Electrical Code.

M. Panels shall be Square "D", G.E., Siemens, Eaton/Cutler-Hammer or approved equivalent.

N. Lockable breakers shall be provided for all breakers serving all HVAC equipment, Plumbing equipment, and kitchen appliances.

4. INSTALLATION INSTRUCTIONS

A. Panelboards with circuit breakers installed before the building has been finished and cleaned shall be masked.

B. All dust and debris shall be removed from the panels before they are energized and placed in service.

C. All panelboard fronts shall be omitted until final punch list inspection is made. Directories for each panelboard shall be completed and available for review by the Engineer at that time.

D. All service equipment shall be marked with the maximum available fault current and the date of the calculation. This information shall be obtained in writing from the serving utility. Provide label adjacent to the service disconnecting means. Document action of the fault current shall be included in the operation and maintenance manual. This labeling shall be provided for all new service installations, service upgrades, and any project that adds or replaces distribution panels or branch panel boards.
E. Where applicable - Provide a warning sign on the service entrance equipment indicating type and location of all on-site emergency power sources in accordance with the NEC.

F. Where applicable – Provide warning sign(s) for alternative power devices (photovoltaic, wind, fuel cell, etc.) on all equipment in accordance with the NEC.

G. All emergency system switchgear, distribution panels and branch panelboards shall be provided with surge protection devices in accordance with the NEC. Refer to Section 264313 Surge Suppression Systems.

5. SAFETY SWITCHES

A. Provide heavy duty safety switches as a final disconnecting means as required by NEC and/or as indicated on the Contract Drawings.

B. All safety switches shall be NEMA Type 1, NEMA 3R, NEMA 4 stainless steel, NEMA 12, or as required by the operating environment, Heavy Duty Type HD, UL listed.

C. All safety switches shall have switch blades that are fully visible in the "OFF" (open) position with the door open.

D. All current carrying parts shall be plated by an electrolytic process to resist corrosion and to promote cooling.

E. Switch mechanism shall be quick-make, quick-break, load break rated, such that during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing and opening action of the contacts has started. The handle and mechanism shall be an integral part of the box (not cover) with facilities for pad locking in the open or closed position with up to three padlocks. Switch doors shall be interlocked with switch handle so that the door can only be opened when the switch is in the "OFF" (open) position.

F. Arc Flash Hazard warning labels shall be affixed to all switches in accordance with Article 110.16 of the National Electrical Code.

G. Switches shall be as manufactured by Square D., G.E., Siemens, Eaton/Cutler-Hammer or approved equivalent.

6. CONTACTORS

A. General

(1) Contactors shall be continuously rated at the specified amperes per pole for all types of ballast and tungsten lighting, resistance and motor load. Contactors shall have totally enclosed, double-break silver-cadmium-oxide power contacts. Auxiliary arcing contacts will not be acceptable. Contact inspection and replacement shall be possible without disturbing line or load wiring. Contactors shall have straight-through wiring with all terminals clearly marked. Contactors shall have a gasketed NEMA Type 1 (NEMA 12 for electrically-held) enclosure, unless otherwise noted or required.

(2) Contactors shall be approved per UL 508 and/or CSA, and be designed in accordance with NEMA Standards. They shall be industrial-duty rated for applications to 600 volts maximum. I.E.C.-style contactors are not acceptable.
(3) Contactors shall have provisions for factory or field addition of:

a. Four N.O. or N.C. auxiliary contacts rated 6 amperes continuous at 600 volts.

b. Single or double circuit, N.O. or N.C., 30 or 60 ampere 600 volt power-pole adder.

c. Control-circuit fuse holder, one or two fuses.

d. 0.2-60 second adjustable interval timer attachment, if so indicated on plans.

e. Transient-suppression module for coil control circuit. Coil control to be 120 volts. Provide circuit or step-down transformer.

B. Electrically Held Lighting Contactors

(1) Contactor coils shall be continuously rated and encapsulated, 120 volt rated. Enclosures shall be NEMA 12, to minimize noise transmission.

C. Mechanically Held Lighting Contactors

(1) Coil-clearing contacts shall be supplied so that the contactor coils shall be energized only during the instance of operation. Both latch and unlatch coils shall be encapsulated. Coils shall be rated for 120 volt operation.

(2) Lighting contactors shall be Square D Class 8903 or equivalent by G.E., Siemens, Eaton/Cutler-Hammer or Allen-Bradley.

END OF SECTION 262400
SECTION 262726 - WIRING DEVICES AND PLATES

1. GENERAL

A. This section of the specifications includes wiring devices, cover plates, weatherproof and dust-tight closures, communications devices and floor outlets.

B. Wiring devices are listed by manufacturer and catalog numbers to establish the quality and type required. Equivalent devices of other manufacturers will be acceptable with prior approval of the Engineer. Submit cutsheets and/or samples of each type ten days prior to bid date for review and written approval to bid. Insofar as possible, standard application or special application devices shall be by one manufacturer.

2. MATERIALS

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<tr>
<th>TYPE</th>
<th>RATING</th>
<th>CONFIGURATION</th>
<th>COLOR</th>
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<td>COMMERCIAL GRADE</td>
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<td>** USE WHEN ON DEDICATED 15A CKT., OR WHEN MORE THAN ONE RECEPTACLE ON A CIRCUIT</td>
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<td>Amperage</td>
<td>Type</td>
<td>Brand/Model</td>
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<td>4-WAY</td>
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<td>SPST</td>
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</table>

**Note:**

Switch, keyed to each be furnished with one Hubbell #1209 key. Turn over to owner at close of project and obtain receipt for verification that keys have been delivered.

**Notes:**

1. Provide matching cap (plug) for all receptacles 30 amp rated and above as required for equipment.

2. All receptacles shall be back or side-wired, clamping type.

3. For dryers and ranges, provide 3-pole grounding type as required by device. Locate device so that dryer or range can be pushed tightly against wall.

4. Receptacles shall be tamper resistant and weather resistant and marked accordingly as required by N.E.C.

5. All receptacles installed in damp or wet locations shall be UL listed weather resistant type.
A. Small Motor Control Switches:

(1) For small line-to-neutral motor loads of 3/4 HP or less, single phase, rated at 120 or 277 volts, provide snap-type, H.P. rated motor starter switch with thermal overloads. Overload heaters sized to match the motor nameplate amperes and the ambient temperature shall be provided. Provide with NEMA 1, NEMA 3R or other enclosure suitable for the location and atmosphere. All manual starters in finished areas shall be in flush-mounted enclosures.

3. COLOR

A. Color of devices shall be as selected by the architect. Samples (devices, plates or both) may be required to be submitted with other architectural color items by the Contractor. The Contractor shall coordinate any such submission required with other trades, the Prime Contractor or as needed.

B. Where devices are controlling or supplying emergency power from a standby source, the device color shall be red, as with switch toggles or receptacle fronts. Plate color shall match others on normal power in the building unless otherwise noted.

C. Where surface finishes next to the devices vary in color or shade throughout the project, the Contractor may be required to provide lighter or darker plates and devices to more closely match wall finishes. These variations are considered to be included in the original contract for construction.

4. PLATES AND COVERS

A. Unless otherwise specified or noted, all wiring device plates and covers shall be smooth thermoplastic, Hubbell "P" Series or equivalent G.E. or Leviton. Color shall match device unless otherwise indicated.

B. All kitchen, gymnasium or food service area plates shall be bright finish 302 stainless steel.

C. Cover plates shall be of one manufacturer insofar as possible.

D. Weatherproof plates for G.F.C.I. receptacles shall be cast aluminum, self-closing, gasketed, suitable for standard box mounting, U.L. listed for wet location use, cover closed. Vertical mounting - Hubbell WP26M, horizontal mounting - Hubbell WP26MH (die-cast zinc) or equivalent Leviton or G.E.

E. Weatherproof switch plates for toggle-handle switches shall be clear silicone rubber, for standard outlet boxes. Hubbell 1795 or equivalent G.E. or Leviton.

F. Cover plates for computer, telephone or other system outlets shall be as required to meet supplier or the owner's requirements, as applicable. Color to match other plates on project. Furnish telephone plates with wall-mounting studs if mounted at 48" or higher. See devices schedule below.

5. COMMUNICATIONS DEVICES AND PLATES
A. Communications devices and wall plates furnished for this project shall all be standard products, of the same manufacturer. They shall consist of a wall plate bezel, capable of holding snap-in devices as indicated.

B. Color of communications wall plates shall match the color of all other plates furnished on the project, matching switch, receptacles, etc. Verify all color selections with the Architect.

C. The color of communications wall plate snap-in inserts shall be as noted herein, or shall be per the owner's standards, if applicable. Verify color requirements prior to ordering any materials.

D. Provide securely-fastened permanent labels in the faceplate of communications wall plates that clearly and legibly indicate the address or unique identifier for an individual jack.

E. All communications wall plates shall be provided with a bezel capable of holding a minimum of four separate device inserts, unless otherwise noted. Provide blank inserts to close any unused positions, of a color to match the plate.

F. Communications wall plates and devices shall be as manufactured by Panduit, Lucent Technologies, Leviton, AMP or approved equivalent.

<table>
<thead>
<tr>
<th>DEVICE INSERT SCHEDULE</th>
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<tr>
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<td>Ethernet Network Data</td>
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<td>Blank Cover</td>
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<td>Wall Plate (4-Port/1 Gang)</td>
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<tr>
<td>Special Comm. Port for T-1</td>
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<tr>
<td>and Special Communication Circuits</td>
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</table>
6. STANDARD SINGLE-SERVICE FLOOR BOXES

A. In general, floor boxes to be used flush in concrete floors shall be of single-gang stamped steel construction, round, deep style, fully adjustable Hubbell B-2537 Series, Type 1 or equivalent.

B. Where multiple gangs are indicated on the plans (or elsewhere), multi-gang (up to 3 yokes maximum) stamped steel, rectangular, deep style units shall be used. They shall be fully adjustable, Hubbell B-2432 Series, Type 1, or equivalent. Multiple-gang boxes shall be provided with removable partitions between each section in accord with N.E.C., where power and non-power circuits enter the same box.

C. In general, all cover plates for floor boxes shall be flush, solid brass. Provide typical plates as listed:

- Duplex Outlet - Round, Duplex Flap - Hubbell S-3925
- Rectangular, Duplex Flap - Hubbell S-3825

- Telephone or Data - Round, Combination 1" or 2 1/8" - Hubbell S-2725
  - Rectangular, Combination 1" or 2 1/8" - Hubbell S-2625

D. Furnish floor boxes with threaded hubs as required to suit conduit routings, 3/4" minimum.

E. Furnish carpet flanges for all boxes installed in carpeted areas. Flanges to be clear polycarbonate plastic, round - Hubbell S-3079 or rectangular, for gangs indicated - Hubbell S-308 Series or equivalent.

F. Floor outlet boxes shall be installed dead level flush with wood, VCT, concrete or other hard surface type floor. Furnish special stop trims for terrazzo where required.

G. Outlets within floor boxes shall be as specified elsewhere in these specifications.

7. SPECIAL MULTI-SERVICE FLOOR BOXES

A. In general, floor boxes that are to contain multiple services such as power, data, voice, video, etc., shall be constructed of stamped steel and heavy thermoplastic with barriers or compartments to separate power from signal services per National Electrical Code.

B. Provide multi-service floor boxes with proper trim for carpet, wood, terrazo, tile or concrete floors, wiring slots, dust covers and proper device plates to hold outlets, jacks, etc. They shall be fully adjustable. Conduit rough-in shall be as required. All tops shall be capable of receiving an insert of the surrounding floor material.

C. Outlets for multi-service floor boxes shall be as specified elsewhere in these specifications.

D. Set boxes dead level with flooring and provide proper support by thickening concrete slab, welding angle iron across joists below or other approved means.

E. Multi-service floor boxes shall be capable of containing a minimum of two duplex receptacles and two 4-position single gang modular plates for voice, video or data jacks and shall be as manufactured by Hubbell #HBLCFB401 base with #HBLTCGNT cover, with all required accessories or equivalent Walker “RFS” Series or Lew. If not installed on carpeted floors, provide flush brass trim.
8. INSTALLATION

A. All wiring devices in dusty areas, exposed to weather and moisture shall be installed in Type "FS" or similar conduit fittings having mounting hubs, with appropriate cover plates.

B. Devices that have been installed before painting shall be masked. No plates or covers shall be installed until all finishing and cleaning has been completed.

C. Provide G.F.C.I. duplex feed-thru style receptacles in accordance with new U.L. Standard 943 where indicated or required by the National Electrical Code, whether specifically called out or not. When a G.F.C.I. receptacle is on a circuit with other non-G.F.C.I. receptacles, it shall always be placed at the homerun point of the circuit and shall be wired to ground-fault interrupt protect the downstream outlets on that circuit unless specifically indicated to the contrary. Provide a "G.F.C.I. protected" label on each downstream outlet.

D. GFCI devices shall be installed in a “readily accessible” location per NEC requirements. GFCI protected outlets required by plans or code shall be fed by a GFCI breaker or upstream GFCI device if they are not readily accessible.

E. Where surge suppression outlets are provided, they shall be ANSI Category "A" style. They shall be installed as dedicated-circuit outlets or where indicated with multiple outlets on a circuit, they shall be placed at the homerun point of that circuit and feed-thru wired to protect the downstream outlets on that circuit.

F. All receptacles shall be installed with ground prong at top position.

G. All outlets not provided with wiring devices shall be closed with a blank plate matching other plates in the area.

END OF SECTION 262726
SECTION 264313 - SURGE SUPPRESSION SYSTEMS

1. GENERAL

A. Each Contractor's attention is directed to Section 260501, General Provisions - Electrical and all other contract documents as they may apply to his work.

B. Each Surge Suppression Unit (transient voltage surge suppressor, or T.V.S.S.) furnished shall meet or exceed U.L. 1449, Second Edition Revision (February 2007), with capacity for each basic Category A, B and C, surge rise time of ten microseconds and a surge duration of at least one thousand microseconds.

C. SPECIAL NOTE: When using a “Meggar” or similar instrument to test conductors in a panelboard or switchboard, disconnect any T.V.S.S. device connected to any combination of those conductors. Failure to do so may damage or destroy the T.V.S.S. device. If any damage occurs as a result of testing to a T.V.S.S. device, the Contractor shall replace the device.

2. SCOPE OF THE WORK

A. The Contractor shall provide the necessary labor, materials, wiring and services necessary to provide the complete electrical surge protection systems as specified herein. This work shall include, but is not necessarily limited to:

   (1) Provision of Surge Suppression Units at certain points in the power distribution network, on telephone, satellite dish leads and cable television service lines as indicated herein or on the drawings.

   (2) Proper installation of surge suppression unit(s), in accord with shop drawings. Wiring routing, grounding, raceways and all connections shall be in exact accord with manufacturer's recommendations, the National Electrical Code, and any other applicable regulations, local or national, or international.

3. QUALITY ASSURANCE

A. The manufacturer shall be regularly engaged in production of surge protection equipment, of types, sizes and ratings required, whose products have been satisfactorily used in similar service for not less than three years.

B. Comply with NEC and NFPA requirements, as applicable to materials and installation of surge protection components and wiring. Surge protection equipment shall be UL listed and labeled for its intended use. TVSS shall be labeled with 200kA Short Circuit Current Rating (SCCR). Where applicable, equipment shall comply with ANSI standards for such equipment.

C. SPECIAL NOTE: The physical routing, length and connections of the unit's phase, neutral and ground conductors are critical to the performance of surge suppression units. The Contractor shall carefully observe and comply with the manufacturer's installation requirements.
4. SUBMITTALS

A. Product Data: Submit manufacturer’s data on surge protection systems and components as part of shop drawing submissions. Indicate all capacity ratings, clamp times, maximum capacities, EMI/RFI attenuation data, withstand capabilities, physical construction and listing agency approvals.

B. Maintenance Data: Submit maintenance instructions for surge suppression system. Include this data in Operation and Maintenance manuals.

5. MATERIALS

A. ACCEPTABLE MANUFACTURERS

Subject to compliance with requirements, manufacturers offering surge protection components which may be incorporated in the work includes, but are not limited to, the ones listed below. Other manufacturers will be considered if their proposed products are in full compliance with these specification requirements.

Surge Protective Devices:

Liebert Corporation, Inc
General Electric Corporation
Transtector, Inc.
Advanced Protection Technologies, Inc.
Square D. Inc.

6. T.V.S.S. MINIMUM REQUIREMENTS

T.V.S.S. minimum requirements shall meet or exceed the following criteria:

A. Minimum surge current capability (single pulse rated) per phase shall be:

(1) Distribution applications: 120 kA per phase (Category “B”)

B. UL 1149 Listed Suppression Voltage Ratings for distribution shall not exceed the following: (Category “B”)
VOLTAGE | L-N | L-G | N-G | MCOV
---|---|---|---|---
208Y/120V | 400 | 400 | 400 | 150V
240Delta/120V | 400 | 400 | 400 | 150V

(With internal disconnect switch 400V and 800V respectively)

(L-N = Line to neutral)
(L-G = Line to ground)
(N-G = Neutral to ground)
(MCOV = Maximum continuous operating voltage)

7. BUILDING ELECTRICAL SERVICE SURGE PROTECTION SYSTEM COMPONENTS

A. GENERAL

(1) Provide UL 1449 Second Edition Revision (February 2007) listed and labeled lightning and transient surge protection devices, installed where shown on the drawings and in accord with the manufacturer’s recommendations.

(2) The surge protection devices shall be shunt type and polyphase, with the ability to conduct high energy transients from line to ground, line to neutral and neutral to ground. Provide in a NEMA 12 enclosure with hinged or screw cover front panel. Provide internal fusing in modules to protect unit.

(3) Provide units with EMI/RFI noise attenuation, using 50 ohm insertion loss test: -50 dB at 100 khz, UL 1283 listed, with an insertion ratio of 50:1 using M.I.L. STD 220-A.

(4) For each surge suppression unit, categories A, B & C, provide unit function status indicators. These indicators shall be mounted in the face of the equipment panel. Provide green L.E.D., illuminated for normal operation, red L.E.D. for trouble/fault or reduction of surge suppression capacity.

(5) Enclosures shall be surface-mounted where panels protected are surface-mounted, flush-mounted for all units in finished areas. Where panels protected are flush-mounted, place surge suppression device above or below panel, aligned and square with panel trim.

(6) Provide disconnecting means for each surge protection device per the following:

Category "B" Devices, at Panels:
30 Ampere, 3 Pole Circuit Breaker in Protected Panel

(7) Internal Device Overcurrent Protection (Fusing)

a. All protection modes (including Neutral to Ground) of each surge suppression device shall be internally fused at the component level with fuse I²t capability allowing the suppressor’s maximum rated transient current to pass through the suppressor without fuse operation. Every suppression component of every mode (including Neutral to Ground) shall also be protected by thermal overtemperature controls. If the rated I²t characteristic of the fusing is exceeded, the fusing shall be capable of opening in less than one millisecond and clear both high and low impedance fault conditions. The fusing shall be capable of interrupting up to 200 KA symmetrical fault current with 600 VAC applied. This overcurrent protection circuit shall be monitored, to provide indication of suppression failure. Conductor level
fuses or circuit breakers internal or external to the surge suppression units are not acceptable as meeting this requirement.

B. PANELBOARD SURGE SUPPRESSION - CATEGORY "B" UNITS

(1) Units shall be installed as indicated herein or on the contract drawings, set beside or above the distribution panel indicated, and connected as recommended by the equipment manufacturer.

(2) All emergency system switchgear, distribution panels and branch panelboards shall be provided with surge protection devices in accordance with the NEC.

(3) Category "B" units shall be rated for 277-480 volts (or 120/208 volts, as indicated), 3-4 Wire Wye service. Units shall be minimum 120,000 ampere rated per phase, with less than 5 nanosecond reaction time. Provide fusing and fault indicator pilot lights as in (A) - General above.

(4) Category "B" withstand capabilities: 5,000 A.N.S.I. Category C3 surges with less than 10% change in clamping voltage.

C. TELEPHONE AND TELEVISION SURGE SUPPRESSION

(1) As a part of this section of work, the Contractor shall provide or arrange for the installation of U.L. listed lightning and surge arrestors on the incoming telephone and television service lines, as well as on AM-FM- antenna downleads and the coaxial cables coming into the building from satellite dish antennas and all other types of exterior antennas installed by the Contractor or Owner, where the Contractor installs the coaxial cable for the antenna.

(2) Arrestors shall be U.L. listed, properly grounded per N.E.C., and shall be located at the service entrance points for each cable installed by a utility company or at the point of building entry for Contractor-installed cables leading in from antennas. Also provide surge arrestors of the proper type for any copper cables that are installed between buildings by the Contractor, if such a condition occurs within the project.

(3) The Contractor shall arrange for the telephone company to install M-O-V, gas-type or other U.L. listed lightning arrestors on each of their incoming telephone circuits that are terminated for building use.

(4) Arrestors for coaxial lines shall be rated 25 to 250 MHZ on cable T.V. lines, and 250 MHZ to 1GHZ on satellite dish lead-ins with BNC jacks in/out or as required by antenna connectors.

(5) Devices as manufactured by Lucent Technologies, Winegard or Liebert Corporation will be acceptable.

(6) Provide a ground lug for individual surge suppression unit installations, with the recommended ground wire size routed back to the building main electrical ground or ground bar in wiring closet.

(7) Where multiple surge suppression units are installed, as at service entrance locations, provide a ground bar, copper, with multiple tapped holes and a properly sized ground lead routed back to the building main electrical ground.

8. EXECUTION

SURGE SUPPRESSION SYSTEM
BLUEGRASS LEXINGTON AIRPORT
GENERAL AVIATION FACILITY
SCB # 1508
A. Installation of Surge Protection Systems:

(1) Install surge protection systems as indicated and in accordance with equipment manufacturer’s written instructions, in compliance with applicable requirements of NFPA, local prevailing codes and with UL lightning and power surge protection standards to ensure that surge suppression systems comply with requirements.

(2) Coordinate with other work, including electrical wiring work as necessary to interface installation of units.

(3) Install conductors with direct, shortest possible phase, neutral and ground paths from all in/out connections, avoiding sharp bends and narrow loops.

(4) Install surge suppression units as close as practical to equipment they are protecting. Install appropriate units at main electrical service entrance equipment and secondary branch panelboards as indicated.

(5) Refer to the drawings for installation of individual surge suppression devices to protect branch circuits. Also see Section 262726 for (receptacle type) device requirements. All receptacle type surge suppression units shall be wired as feed-thru type, to protect all downstream outlets on that branch circuit unless otherwise indicated.

9. WARRANTIES

A. All surge suppression equipment shall be unconditionally warrantied by the Contractor for a period of one year from the date of project substantial completion. Where longer manufacturer’s warranties are offered, they shall be made available to the Owner. Note these extended warranties in the Operations and Maintenance Manuals.

B. Category "B" and "A" devices to carry 2 year unconditional replacement warranty.

END OF SECTION 264313
1. GENERAL

A. Furnish and install all lighting fixtures, as herein specified, complete with lamps and accessories for safe and effective operation. All fixtures shall be installed and left in an operable condition with no broken, damaged or soiled parts.

B. All items furnished shall comply with the latest standards applicable such as U.L., NEMA, etc., and shall bear labels accordingly. All fixtures shall be the color specified or as selected by the Architect. Wherever fixtures have evident damage, they shall be restored to new condition or shall be replaced. Likewise, fixtures showing dirt, dust or finger prints shall be restored to new condition or shall be replaced.

C. Eight copies of light fixture factory shop drawings and cuts, showing fixture dimensions, photometric data, installation data and, if applicable, air handling data, shall be submitted to the Engineer for written approval 30 days after bid date. (Verify shop drawing quantities with the Architect.)

D. Locate pendant, surface mounted or chain-hung industrial fixtures in mechanical rooms and similar spaces to avoid ductwork and piping. Locate around and between equipment to maximize the available light. Request a layout from the Engineer if uncertain about an installation.

E. Alternate fixtures may be substituted for types specified by name or catalog number. Proposed substitutions must be submitted to the Engineer ten working days prior to bid date for written approval to bid. This written approval will only be issued in addendum form.

F. Where emergency battery packs or integral emergency transfer relays are provided with fixtures, they shall be connected to an unswitched power line and wired in accord with the manufacturer's recommendations. Test buttons and indicator lamps shall be visible and accessible with fixture door open, or shall be remotely flush mounted in the ceiling adjacent to the fixture.

G. Where remote emergency lighting transfer relays are provided, they shall be flush mounted in the ceiling adjacent to a controlled fixture. They shall be connected to an unswitched power line and installed in accord with the manufacturer's recommendations. Test buttons and indicator lamps shall be visible and accessible without removing ceiling tiles or access panels.

H. All reflecting surfaces, glass or plastic lenses, ballast housings, parabolic louvers, downlighting Alzak cones and specular reflectors shall be handled with care during installation or lamping to avoid fingerprints or dirt deposits. It is preferred that louvers be shipped and installed with clear plastic bags to protect louvers. At close of project, and after construction air filters are changed, remove bags. Any louver or cone showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer to a like-new condition, or replaced as necessary in order to turn over to the Owner new fixtures at beneficial occupancy.

I. Where fixtures are scheduled to be provided with quartz restrike relay and lamp, for auxiliary or emergency illumination, the controlling relay shall be configured to energize the lamp on cold start or hot lamp restrike.

J. Refer to architectural details as applicable for recessed soffit fluorescent fixtures or wherever fixture installations depend upon work of other trades. Coordinate all installations with other trades. Verify dimensions of spaces for fixtures, and if necessary, adjust lengths to assure proper fit and illumination of diffuser and/or area below.
2. VOLTAGE
   
   A. All lighting fixtures will be rated 120, 277 or 480 volts, single phase as indicated or required.

3. BALLASTS

   A. Electronic Instant-Start Fluorescent Ballast Specifications

      (1) Fluorescent ballast to be instant-start high performance electronic to operate at a frequency of 20KHz or higher with less than 2% lamp flicker, at an input voltage of 108 to 132 VAC (120 volt line) or 249 to 305 VAC (277 volt line) at an input frequency of 60 Hz, minimum of .88 ballast factor, power factor of .98. Light output to remain constant for line voltage of ± 4%. Ballast to comply with EMI and RFI limits set by FCC (CFR 47 part 18) for normal electrical equipment and have less than 1.4 lamp current crest factor (or less if required by the fluorescent lamp supplier). Verify this prior to submitting shop drawings. Ballast to meet ANSI Standard 82.41 and be UL listed Class P Type I. Ballast shall be non-PCB bearing.

      (2) Ballast to have less than 10% total harmonic distortion with less than 6% third harmonic distortion. Ballast to have "A" sound rating with a power factor greater than .99 and have a twenty year rated life. Ballasts used shall operate 1, 2, 3, or 4 T8 lamps as specified in the fixture specification. Use a 2, 3 or 4-lamp ballast to match number of lamps in fixture, and meet all switching requirements as shown on the drawings. Ballasts shall be unconditionally warranted by the manufacturer for a period of three years from the date of substantial completion.

      (3) Motorola, Advance, Universal or Valmont are acceptable manufacturers.

      (4) Provide in-line fuse-holder(s), with fuse sized per manufacturer's recommendations for each 277 volt fixture.

   NOTE: No single 2, 3, or 4 lamp ballast with 2 source input will be allowed for any fixture(s) shown supplied by both normal and emergency power.

   B. Metallic vapor lamp (H.I.D.) ballast shall be rated 120 or 277 or 480 volts, 60 Hertz energy-saving high power factor, copper wound, auto regulator type for single lamp, complete with external fuse holder (Bussmann HLR) and as manufactured by Jefferson, G.E., or Advance. All vapor lamp ballasts shall be encapsulated or potted to minimize the amount of audible hum produced. No open core and coil ballasts shall be provided unless specifically indicated in the fixture description. Ballast factor for all H.I.D. ballasts shall be 1.0 ± 5% tolerance. Ballast shall deliver full wattage, to match the rating of the lamp, assuming proper input voltage, within the tolerance range noted.

   C. Where lighting standards have fuses protecting ballasts, an in-line type of fuseholder shall be located at the base of the pole, readily accessible behind the handhole coverplate. Where multiple circuited luminaires are on a single pole, identify the separate fuseholders.

4. LIGHT FIXTURE GENERAL REQUIREMENTS

   A. LED Recessed Lighting Fixtures - General Requirements
(1) The following are minimum requirements for recessed LED fixtures for lay-in grid, gypsum board, plaster and concealed spline ceilings. Surface-mounted fluorescent fixture requirements shall be similar.

(2) Housings shall be a minimum of 4" depth, premium grade, constructed of a minimum 22 gauge die embossed or stiffened cold rolled pre-treated rust-resistant steel.

(3) All parts shall be finished with polyester powder or white baked enamel (85% minimum reflectance) painted after fabrication. All wiring shall be type TFN, or THWN and shall be covered by the steel ballast cover, wiring channel, or socket track. Exposed wiring is not acceptable. Connection wiring shall be accessible thru a hinged access plate above ballast channel in top of unit.

(4) Drivers are to be as specified. If a manufacturer and series number is listed, substitution by other manufacturers shall be of the exact same specification (sound rating, energy consumption, life expectancy, warranties, physical size, heat and temperature ratings), etc. All ballasts shall be 0-10 Volt dimming, cool operating, UL listed.

(5) The complete light fixture unit shall be UL listed and labeled. Other agency listings may be acceptable with written approval from the Engineer.

(6) Fixture lens doors shall be reversible, hinged, painted after fabrication, with spring-loaded or other mechanically stable positive action latches.

(7) Lens shall be as specified for each fixture type. If a specific manufacturer and series number of lens is listed, the substitute shall be of the exact specification (thickness, prism configurations, transparency, efficiency, photometric distribution, hardness, vandal-resistance, etc.). Minimum average thickness of any prismatic lens shall be .125".

(8) Fixture trim and/or flanges shall conform with ceiling constructions as required. Verify all types prior to submission of shop drawings and indicate any special types on submittals. Fixtures installed in drywall or plaster ceilings to be provided with flange, screed and swing gate anchoring system.

(9) All fixtures shall be furnished with hold down clips to meet applicable seismic codes, four clips per fixture minimum or the equivalent thereof in the installation trim. Verify thickness of drywall or plaster ceilings prior to submission of shop drawings, to allow for proper trim adjustment.

(10) Support fixtures with one hanger wire at each end. Hanger wires shall be installed within 15° of plumb, maximum or additional support shall be provided. Wires shall be attached to the fixture body and to the building structure - not to the supports of other work or equipment.

(11) Each type of lay-in fixture shall be furnished with the proper housing flange or lip to suit the type of lay-in grid(s) being utilized on the project. The Contractor is to verify if narrow or
standard grid members are being furnished and provide the proper type of light fixture trim. Indicate any special trims on shop drawing submittals.

B. Industrial and Striplight LED Fixtures - General Requirements

(1) Units shall have die-formed heavy gauge cold rolled steel channels and die-embossed reflectors.

(2) Finishes to be coated with a gloss powder paint or baked enamel finish with a minimum 85% reflectance.

(3) Units to have aligner clips where required for a continuous row appearance. Where continuous rows exceed twelve feet in length, provide a "unistrut" channel or similarly adequate mounting to stiffen and align row.

(4) Units to be UL listed.

(5) Mounting brackets and hanging mechanisms shall be as specified in fixture descriptions, or as required. Allow a generous safety margin with all support systems, as recommended by the manufacturer.

C. Recessed Ellipsoidal or Parabolic Cone Downlight - General Requirements

(1) Fixture to have an extruded or die-cast aluminum lampholder housing. Retaining mechanism shall provide easy access to lamp and ballast junction box.

(2) Unit to have a corrosion-resistant steel junction box with hinged access covers and thermal protector.

(3) Mounting/plaster frame to be heavy gauge steel with finishing trim friction support springs, for the required ceiling thickness. Trim to be of color as selected by the Architect.

(4) Optical system to consist of a specular clear Alzak upper ellipsoidal (or parabolic, as noted) reflector with specular Alzak cone or microgroove matte black baffle as noted in schedule. Units shall have a UL approved clear tempered glass protection lens where used with metal halide or quartz lamp. Where other than clear Alzak cone/reflector color is noted on the schedule, it shall be furnished as specified.

(5) Fixture to have a prewired, encased and potted driver (0-10V) tray module.

(6) Provide telescoping channel bar hangers that adjust vertically and horizontally.

(7) Minimum flange shall match cone finish or provide painted color as selected by the Architect on black microgroove baffle types.
(8) Fixtures to be UL listed for thru-branch circuit wiring, recessed, and damp locations. Where installed in plaster or drywall or other inaccessible ceiling type, they shall be U.L. listed for bottom access.

D. Exit Lights - General Requirements

(1) Housings and canopies shall be die-cast aluminum or corrosion resistant steel. Mountings shall be wall or ceiling, universal type, to suit the installation conditions.

(2) All exit signs are to be architectural style with edge lit feature.

(3) Provide with stencil face, lettering color red, of sizes in accord with code, or as otherwise specified.

(4) Provide single or double face as scheduled, indicated on plans or as required by the local authority having jurisdiction. Adjust installation position if required for clear visibility, in accord with applicable codes.

(5) Complete unit to be finished in color as selected by the Architect. Provide directional arrows as indicated on plans, as scheduled to suit the means of egress or as required by the local authority having jurisdiction.

(6) LED shall be long-life type.

E. LED Fixtures

(1) Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this specification.

(2) Each luminaire shall be designed to operate at an average operating temperature of 25°C.

(3) The operating temperature range shall be 0°C to +25°C.

(4) Each luminaire shall meet all parameters of this specification throughout the minimum operational life of 50,000 hours when operated at the average operating temperature.

(5) Led Sources

a. LED’s shall be manufactured by a manufacturer who has produced commercial LEDs for a minimum of five (5) years.

b. Lumen Output – minimum initial delivered lumen output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0-360 degree zone - as measured by IESNA Standard LM-79-08 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
c. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours at the rated ambient operating temperature

d. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire Luminaire

e. LED Boards shall be suitable for field maintenance and have with plug-in connectors. LED boards shall be upgradable.

(6) Light Color/Quality-

a. Correlated Color temperature (CCT) range as per specification, between 3000K, 3500K and 4000K shall be correlated to chromaticity as defined by the absolute (X,Y) coordinates on the 2-D CIE chromaticity chart.

b. Color shift over 6,000 hours shall be <0.007 change in u’ v’ as demonstrated in IES LM80 report.

c. The color rendition index (CRI) shall be 80 or greater.

d. LED boards to be tested for color consistency and shall be within a space of 2.5 MacAdam ellipses on the CIE chromaticity chart.

(7) Power Supply and Drive

a. Driver: Acceptable manufacturer: eldoLED, Sylvania, or Philips that meet or exceed the criteria herein:

b. Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.

c. Driver should be UL Recognized under the component program and shall be modular for simple field replacement.

d. Electrical characteristics: 120 – 277 volt, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.

e. Dimming: Driver shall be suitable for full-range dimming. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100 percent to 0.1 percent of rated lumen output with a smooth shut off function.

f. Dimming shall be controlled by a 0-10V signal, or if require “DMX”.

g. Driver shall include ability to provide no light output when the control signal drops below 0.5 V, and shall consume 0.5 watts or less in this standby.
h. Driver shall be capable of configuring a linear or logarithmic dimming curve.

i. Drivers shall track evenly across multiple fixtures at all light levels, and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range regardless of the controller type.

j. Flicker: Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100-0.1 percent luminaire shall have:

1) Less than 1 percent flicker index at frequencies below 120 Hz.

2) Less than 12 percent flicker index at 120 Hz, and shall not increase at greater than 0.1 percent per Hz to a maximum of 80 percent flicker index at 800Hz.

k. Driver disconnect shall be provided where required to comply with codes.

l. The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements.

m. The surge protection which resides within the driver shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for Location Category A, where failure does not mean a momentary loss of light during the transient event.

(8) Electrical

a. Power Consumption: Maximum power consumption, +/- 5% when operating between 120 – 277V (or 346V) shall be as follows:

1) A minimum of 110 lumens per watt.

2) Operation Voltage - The luminaire shall operate from at 60 HZ ±3 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage of plus or minus 10% shall have no visible effect on the luminous output.

3) Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.

4) THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage and meet ANSI C82.11 maximum allowable THD requirements.

5) Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference. Withstand up to a 1,000 volt
surge without impairment of performance as defined by ANSI C62.41 Category A. To reduce false circuit breaker tripping due to turn on inrush, the following statement ensures that electronic dimming driver will meet NEMA inrush recommendations.

6) Inrush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 Amps per 10 seconds.

7) RF Interference: The luminaire and associated onboard circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.

8) Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance:

9) Adjustment of forward LED voltage, supporting 3V through 60V.

10) Adjustment of LED current from 200mA to 1.05A at the 100 percent control input point in increments of 1mA

11) Adjustment for operating hours to maintain constant lumens (within 5 percent) over the 50,000 hour design life of the system, and deliver up to 20 percent energy savings early in the life cycle.

12) Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without removing the fixture from the ceiling.

13) All electrical components shall be RoHS compliant

5. LIGHTING FIXTURE SCHEDULE

Note: Each vendor proposing to bid the materials specified herein below is cautioned to review all requirements of the Contract Documents, as they may apply to the work involved, particularly Specifications Articles 1 thru 5 of this Section. The general materials requirements are to be met in their entirety by the contractors and vendors supplying these materials. Note: Unless otherwise noted, all 48" dimension fixtures shall be provided with 48" T8 32 watt 2900 lumen 4100°K C.C.T. lamps, quantity as specified, with companion 2, 3 or 4 lamp electronic ballasts. Where fixtures with ballasts have switches that controls lamps individually or in groups, the proper number of separate ballasts shall be provided. Refer to the drawings for specific control information.

TYPE DESCRIPTION: REFER TO THE DRAWINGS

6. PHOTOCELLS

LIGHTING FIXTURES AND LAMPS
BLUEGRASS LEXINGTON AIRPORT
GENERAL AVIATION FACILITY
SCB # 1508
A. Provide 120, 277 or 480 volt (rated as needed), 1000 or 2000 watt photocells as needed for control of certain circuits or fixtures as indicated on plans. They shall be as manufactured by Tork, Paragon, AMF or approved equivalent.

B. Mount photocells in locations concealed from sight lines standing on ground unless otherwise noted, in which case the final position shall be as directed by the Architect. Group together (if indicated at one location) and mount on back of parapet wall or otherwise properly support with mounting bracket. Coordinate with roofing installer to ensure that roof penetrations are properly made without violating or reducing the roof warranty in any way. Photocells may be mounted in other locations if it is not practical to install them on roofs or parapets, in which case the Contractor shall request direction for their mounting locations from the Engineer or Architect. Photocells shall always be mounted in a weatherproof, inconspicuous manner.

7. TIMECLOCKS

A. Provide synchronous motor-driven timeclock(s) to control the indicated loads. The number of poles, their ampacity and voltage withstand shall be to suit the load, but in no case less than 30 amps, 277 volts.

B. Timeclock coil and motor power shall be 120 volts AC, backed up with seven day spring winder which is automatically replenished in normal operation. Provide a 120 volt control circuit from the nearest available panelboard.

C. Provide with an astronomical dial, set up and calibrated for the week and month the timeclock is placed in operation. Order unit for the proper geographical latitude for the project site. Also provide day light savings time option and calibrate for April-October dates. Provide instruction to the Owner's representative in proper setting and operation of each type of timeclock provided.

D. Enclosures for timeclocks shall be surface type, NEMA 1 or NEMA 3R as needed. Where exposed in finished areas, provide flush-style NEMA 1 enclosures.
SECTION 265116 – NETWORK LIGHTING SYSTEMS

1. GENERAL

A. Introduction

(1) The work covered in this section is subject to all of the requirements in the General Conditions of the specifications.

(2) Contractor shall coordinate all of the work in this section with all the trades covered in the other sections of the specification to provide a complete and operative system.

B. Description of Work

(1) Extent of lighting control system work is indicated by drawings, and by the requirements of this section. It is defined to include low voltage lighting control panels, switch inputs, sensors and wiring.

(2) Type of lighting control equipment and wiring specified in this section include the following:
   a. Low Voltage Lighting Control Relays.
   b. Occupancy Sensors
   c. Control devices/switches
   d. Networked lighting controller via Ethernet with BACNet communication to BAS system.

C. Quality Assurance

(1) UL & ULc Approvals
   a. The control panels shall be tested and listed under the UL 916 Energy Management Equipment standard and CSA C22.2 #205 by a nationally recognized testing laboratory.

(2) NEC Compliance
   a. The control system shall comply with all applicable National Electrical Codes regarding electrical wiring standards.

(3) NEMA Compliance
   a. The control system shall comply with all applicable portions of the NEMA standards regarding the types of electrical equipment enclosures.

(4) Component Pre-testing
   a. All control equipment shall undergo strict inspection standards. The equipment shall be previously tested and burned-in at the factory prior to installation.

(5) System Checkout
   a. A factory trained technician or factory authorized personnel or contractor shall functionally test the control system and verify performance after installation.

(6) Manufacturer
   a. Manufacturer shall have a minimum of 10 years experience in control systems. Manufacturer shall provide off the shelf control products from its inventory. Control systems that require custom assembly and sizing shall not be acceptable. Product shall be Lutron Quantum Ecosystem, Cooper Greengate, or approved equal.

D. BAS Interface

(1) The building lighting control system shall be provided with a bi-directional interface with the campus-wide Building Automation System. All control, programming, and output status monitoring available to the lighting control system shall be accessible to the BAS.
(2) Provide all connections, translators, interface devices, programming, etc. necessary to allow the BAS full control over the lighting system. This system shall interface with the KCTCS CEMCS (Commonwealth Energy Management and Control System).

E. Submittals
   (1) Product Data
   Submit manufacturer’s data on lighting control system and components.

   (2) Shop Drawings
   Submit drawings of lighting control system and accessories including, but not necessarily limited to the low voltage relay panels, power wiring, inputs, and interface devices. Include cabling and device layout based on building floor plan.

2. WALL BOX CONTROLS

   A. Provide low voltage switches, power packs, occupancy sensors (dual contact outputs), and wall plate kits that are designed, tested, manufactured, warranted, and provided by a single manufacturer unless otherwise noted. Lutron or pre-approved equal by, nLight Controls, and Cooper Greengate Controls.

   B. Provide seamless faceplates with no visible means of attachment.

   C. Color
      1. Custom color to be selected by Architect.
      2. Visible parts: Exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674. Provide proof of testing upon request.

3.1 POWER INTERFACES

   A. Electrical:
      1. Phase independent of control input.
      2. Dimmer to meet limited short circuit test as defined in UL 20.

   B. Diagnostics and Service: Replacing power interface does not require re-programming of system or processor.

   C. Low Voltage Wall Stations or Equal
      1. Electronics:
         a. Use Ethernet (Cat 6/RJ45) wiring for low voltage communication.
      2. Electronics:
      3. Functionality:
         a. Upon button press, LEDs to immediately illuminate.
         b. LEDs to reflect the true system status. LEDs to remain illuminated if the button press was properly processed or the LEDs turn off if the button press was not processed.
         c. Allow for easy reprogramming without replacing unit.
         d. Replacement of units does not require reprogramming.
      4. Provide faceplates with concealed mounting hardware.

   D. Color:
      1. Visible parts: Exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674. Provide proof of testing upon request.

   E. Provide faceplates with concealed mounting hardware.

3.4 LOW VOLTAGE CONTROL INTERFACES

   A. Emergency Lighting Interface
1. Senses all three phases of building power.
2. Provides an output to power panels if power on any phase fails.
3. Accepts a contact closure input from a fire alarm control panel.

4. LOW VOLTAGE SWITCHING
   A. Provide hardware that is designed, tested, manufactured, and warranted by a single manufacturer. nLight, Lithonia, Lutron, or Cooper.
   B. Lighting Controls: Ten-year operational life while operating continually at any temperature in an ambient temperature range of 0°C (32°F) to 40°C (104°F) and 90 percent non-condensing relative humidity.
   C. Designed and tested to withstand electrostatic discharges up to 15,000 V without impairment per IEC 801-2.

4.1 PANEL / RELAY PERFORMANCE REQUIREMENTS
   A. Electrolytic capacitors to operate at least 20°C below the component manufacturer's maximum temperature rating when device is under fully-loaded conditions in 40°C (104°F) ambient temperature.
   B. Capable of withstanding repetitive inrush current of 50 times operating current without impacting lifetime of dimmer/relay.
   C. Design and test relays to withstand line-side surges without impairment to performance.
      1. Panels: Withstand surges without impairment of performance when subjected to surges of 6,000 volts, 3,000 amps per ANSI/IEEE C62.41B.
   D. Utilize air gap off, activated when user selects “off” at any control to disconnect the load from line supply.
   E. Possess power failure memory such that if power is interrupted and subsequently returned, lights will automatically return to same levels (on or off) prior to power interruption within 3 seconds.
   F. Non-dim circuits to meet the following requirements:
      1. Rated life of relay: Minimum 1,000,000 cycles.
      2. Load switched in manner that prevents arcing at mechanical contacts when power is applied to load circuits.
      3. Fully rated output continuous duty for inductive, capacitive, and resistive loads.
   G. LCD Panel Processor
      1. System to be password protected.
      2. Language selection: English
      3. Integral contact closure inputs.
      4. Programming and system operation:
         a. Control stations, control interfaces, and contact closure inputs
            1). Assign functionality of each control station button or infrared interface
               a). Select patterns
               b). Select customized pattern
               c). Enable/Disable time clock
               d). Initiate delay to off
e). Toggle one, some, or all zones
            2). Ethernet interface, BACNET interface
            3). Contact closure output: Momentary or maintained
      b. Time clock
         4). Integral astronomical time clock
            f). Geographic location (city or latitude/longitude).
g). Adjustable date and time format.
h). Adjustable starting and ending of daylight savings time.
i). Review and modify time clock schedule to add, copy, modify, and delete events.
c. Overrides:
   5). Set circuit status
   6). Select pattern
   7). Time clock override
   8). Control station overrides
   9). After-hours override

I. Diagnostics and Service:
   1. Replacing relay does not require re-programming of system or processor.
   2. Relays: Include diagnostic LED’s to verify proper operation and assist in system troubleshooting.
   3. Include tiered control scheme for dealing with component failure that minimizes loss of control for occupant.
      a. If lighting control system fails, lights to remain at current level. Panel processor provides local control of lights until system is repaired.
      b. If panel processor fails, lights to remain at current level. Circuit breakers can be used to turn lights off or to full light output, allowing non-dim control of lights until panel processor is repaired.
      c. If relay fails, factory-installed mechanical bypass jumpers to allow each relay to be mechanically bypassed. Mechanical bypass device to allow for switching operation of connected load with relay removed by means of circuit breaker.

4.3 LOW-VOLTAGE WALL STATIONS
   A. The following statement provides for reliable wired communication.
   B. Functionality:
      1. Upon button press, LEDs to immediately illuminate.
      2. LEDs to reflect the true system status. LEDs to remain illuminated if the button press was properly processed or the LEDs turn off if the button press was not processed.
      3. Allow for easy reprogramming without replacing unit.
      4. Replacement of units does not require reprogramming.
   C. Color:
      1. Visible parts: Exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674. Provide proof of testing upon request.
   E. Provide faceplates with concealed mounting hardware.

4.4 LOW VOLTAGE CONTROL INTERFACES
   A. Ethernet Interfaces:
      1. Provide ability to communicate by means of TCP/IP over Ethernet to Softswitch128 system by means of user-supplied PC or digital audiovisual equipment. Control to be located within 300 feet (100 meters) of Ethernet source.
      2. Provide access to:
         a. Pattern selections.
         b. Control individual zones.
         c. Enable/disable time clock.
         d. Setting of time clock.
         e. Enable/disable wall station.
         f. Simulate wall station button press.
g. Reading/setting of system variables.

3. Provide status monitoring through button feedback and pattern-status updates.

B. Emergency Lighting Interface:
1. Provides total system listing to UL924
2. Senses all three phases of building power.
3. Provides an output to power panels if power on any phase fails.
4. Accepts a contact closure input from a fire alarm control panel.

C. Provide BACNET Communication interface.

5.1 POWER PANELS
A. Mechanical
1. Listed to UL 508 (United States) as industrial control equipment.
2. Delivered and installed as a UL listed factory assembled panel.
3. Field wiring accessible from front of panel without need to remove dimmer assemblies or other components.
4. Panels passively cooled via free-convection, unaids by fans or other means. If panels are mechanically cooled, contractor to include a service contract to provide inspection and maintenance service on a semi-annual basis over the life of the equipment.

B. Electrical
1. Panels contain branch circuit protection for each circuit unless the panel is a dedicated feed-through type panel or otherwise indicated on the drawings.
2. Branch circuit breakers; meet following performance requirements:
   a. Listed to UL 489 as molded case circuit breaker for use on lighting circuits.
   b. Contain visual trip indicator; rated at 10,000 AIC.
   c. Thermal-magnetic construction for overload, short-circuit, and over-temperature protection. Use of breakers without thermal protection requires dimmers/relays to have integral thermal protection to prevent failures when overloaded or ambient temperature is above rating of panel.
   d. Accept tag-out/lock-out devices to secure circuit breakers in off position when servicing loads.
   e. Replaceable without moving or replacing dimmer/relay assemblies or other components in panel. Since lighting applications may require loads to be disconnected multiple times throughout its life, breakers need to be rated for this type of operation.
   f. UL listed as switch duty (SWD) so that loads can be switched on and off by breakers.
3. Minimum UL listed Short Circuit Current Rating (SCCR) of 22,000A.

D. Circuit Selector:
1. Provide following capabilities:
   a. Operate circuits directly from panel processor for system diagnostics and provide feedback of system operation.
   b. Electronically assign each circuit to any zone in dimming system.
   c. Determine normal/emergency function of panel and set emergency lighting levels.
2. React to changes from control within 20 milliseconds.

F. Diagnostics and Service:
1. Replacing dimmer/relay does not require re-programming of system or processor.

6. ADDRESSABLE FIXTURE LIGHTING CONTROL
1. Basis of Design: nLight, Lutron, Starfield, Lithonia or Cooper

6.1 GENERAL PERFORMANCE
A. Based on integrated control requirements, system will control lighting with the following hierarchy:
   1. Emergency (Highest priority): Ignores all other inputs.
   2. Programming: During system programming, sensor inputs are ignored.
   3. Occupant sensor: Allows lights to be on/off. All sensors are to have dual output signals with
      one signal for lighting control and one signal interfaced to HVAC controls.
   4. Daylight sensor: Imposes a high end limit for light output.
   5. Personal control: Fine tune light levels up to the daylight sensor limit.

B. Response to a single sensor can be unique on fixture by fixture basis.

C. Power failure recovery – All devices return to their previous light level prior to power loss.

D. All programmable devices have integral power failure memory to maintain settings for a minimum
   of 10 years during power loss.

E. Wall station and sensor replacement is accomplished without programming.

6.2 LOW-VOLTAGE WALL STATIONS

A. General
   1. Class 2 (low voltage).
   2. Integral IR receiver for programming.
   3. Immediate local LED response upon button activation to indicate that a system command has
      been requested.
   4. Wall stations can be replaced without reprogramming.
   5. Color
      a. Architect to provide selection

B. One Button Control
   1. Toggle on/off and master raise/lower control for group of fixtures.
   2. “Press and Hold” button programming for creating and modifying groups.

D. Four Button Control
   1. Recall 4 Scenes plus all on or all off for one group of fixtures.
   2. Master raise/lower control entire group of fixtures.
   3. “Press and Hold” button programming supports:
      a. Create and modify groups.
      b. Modify scene levels.

6.3 SENSORS

A. General
   1. Use Class 2 wiring for low voltage communication.
   2. Occupancy sensors to be dual output (lighting control and HVAC)
   3. Can be replaced without reprogramming.
   4. Color:
      a. Match NEMA WD1, Section 2 White.
   5. Mountable on lighting fixtures or recessed acoustical ceiling tiles.
   6. Lighting Hub utilizes Ethernet connectivity management
      a. Dedicated Network Environment is used to connect with lighting hubs.

7. LIGHTING MANAGEMENT SOFTWARE

A. Provide system software and hardware that is designed, tested, manufactured, and warranted by a
   single manufacturer

B. Software Overview:
   1. Software shall provide the following capabilities
      a. Setup and Configuration
1. Automatic discovery of all lighting control system equipment including: Lighting Hubs, bus supplies, modules, sensors, wall controls
2. Assign names to controllers including bus supplies and relays
3. Assign names to devices including: Lighting hubs, modules, sensors, wall controls, and relays.
4. Create and modify grouping of devices
6. Define spaces and assign devices to the space
7. Graphical Creation Tool for Floorplan Control
   b). Add icons and associate to devices.
   c). Associate users with a defaulted floorplan
b. Monitor and Control
   1). System summary
   2). Individual device status
   3). Set light levels or shade positions of groups or individual devices
   4). Select presets on groups or individual devices
   5). Average light level and calculated power consumption
   6). Peak power demand control adjusts light levels to reduce peak power demand.
c. Graphical Monitor and Control
   1). Floorplan based
      a). Navigation between multiple floorplans.
      b). Monitor individual device status
      c). Set light levels of groups or individual devices
      d). Set window treatment positions of groups or individual devices.
      e). Select presets on groups or individual devices
   1. Select presets on groups or individual devices
d. Timeclock
   1). Create and modify timeclock events
   2). Time-of-day and astronomic events
   3). Enable or disable individual timeclock events
   4). Set light levels of groups or individual devices.
   5). Set window treatment positions of groups or individual devices.
   6). Enable or disable sensors.
e. Alarms
   1). Create and modify alarms
f. Reports/Logs
   1). Calculated power consumption
   2). Average light level
   3). Log of user activity
   4). Timeclock events
   5). Alarms generated and acknowledgment
g. User Management
   1). Create users and assign access rights.
   2). Up to two concurrent users.
h. Diagnostics
   1). Test and verify device operation
i. Automatic Reconnect
   1. If Ethernet connectivity is lost, the lighting hub will reconnect to the server automatically when connectivity is restored.

8. OCCUPANCY SENSORS

A. Provide system software and hardware that is designed, tested, manufactured, and warranted by a single manufacturer.

B. Architectural Lighting Controls: Ten-year operational life while operating continually at any temperature in an ambient temperature range of 0° C (32°F) to 40° C (104°F) and 90 percent non-condensing relative humidity.

C. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC 801-2.

D. By using substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.

E. Provide complete engineered shop drawings (including power wiring) with deviations for the original design highlighted in an alternate color to the engineer for review and approval prior to rough-in.

F. All occupancy sensors are to have dual output signals. One signal for lighting control and one signal to interface to HVAC control system.

8.1 SENSOR PERFORMANCE REQUIREMENTS

A. Sensing mechanism:
   1. Infrared: Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
   2. Ultrasonic: Utilize an operating frequency of 32kHz or 40kHz that shall be crystal controlled to operate within plus or minus 0.005% tolerance.
   3. Dual technology:
      a. Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
      b. Utilize an operating frequency of 32kHz or 40kHz that shall be crystal controlled to operate within plus or minus 0.005% tolerance.

B. Field adjustable controls for time delay and sensitivity to override any adaptive features.

C. Power failure memory:
   1. Controls incorporate non-volatile memory. Should power be interrupted and subsequently restored, settings and learned parameters saved in protected memory shall not be lost.

D. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC 801-2.

8.2 CEILING AND WALL MOUNT SENSORS

A. Provide all necessary mounting hardware and instructions.

B. Sensors shall be Class 2 devices.

C. Indicate viewing directions on mounting bracket for all Ceiling mount sensors.

D. Provide customizable mask to block off unwanted viewing areas for all ceiling mounted sensors using infrared technology.

E. Provide swivel mount base for all wall mount sensors.

F. Provide an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options.

8.3 WALL SWITCHES

A. Provide vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0 mm thickness.
B. Provide a recessed bypass manual "override on" key on each sensor.
C. Provide a mechanical air-gap on/off function for all Ultrasonic sensors.

8.4 SENSOR POWER PACKS
A. Plenum rated
B. Control wiring between sensors and control units shall be Class 2, 18-24 AWG, stranded U.L. Classified, PVC insulated TEFOLON jacketed cable suitable for use in plenums]
C. Integrated, self-contained unit consisting internally of an isolated load switching control relay and a power supply to provide low-voltage power (PP-SH does not supply power).

8.5 PHOTOCELL
A. Provide photocell approved and distributed by the lighting control manufacturer.
B. Photocell sensitivity shall be adjustable.
C. Photocell to be capable to be mounted in surface or lay-in ceiling applications.

9. EXECUTION
A. Equipment Installation and Documentation
   (1) Installation
       The control system shall be installed and fully wired as shown on the plans by the installing contractor. The contractor shall complete all electrical connections to all control circuits, and override wiring.
   (2) Documentation
       The contractor shall provide accurate “as-built” drawings to the owner for correct programming and proper maintenance of the control system. The “as-builts” shall indicate the load controlled by each relay and the relay panel number.
   (3) Operation and Service Manuals
       The factory shall supply all operation and service manuals.

B. SYSTEM DELIVERY AND ACCEPTANCE
   (1) Delivery
       a. The contractor is responsible for complete installation of the entire system according to strict factory standards and requirements. The following items shall constitute factory standards and requirements:
          1. All system equipment shall operate in accordance with specification and industrial standard procedures
          2. An operational user program shall exist in the control system. The program shall execute and perform all functions required to effectively operate the site according to the requirements.
          3. Demonstration of program integrity during normal operation and pursuant to a power outage.
          4. Contractor shall provide a minimum of two training hours on the operation and use of the control system. Additional support services shall be negotiated between the contractor and the building owner or manager.

C. SPARE PARTS
   (1) Provide 5% or a minimum of (1) spare for the following devices:
a. All occupancy and light level sensors.
b. All interface devices, including control stations and wall box dimmers.
c. All types of replaceable control panel modules.
d. All photocells.

D. WARRANTY

(1) Warranty

a. Manufacturer shall supply a 1-year warranty on all hardware and software. These warranties will be in affect for all installations. Systems that provide special warranties based on installation shall not be acceptable.

END OF SECTION 265116
SECTION 270610 – VOICE/DATA COMMUNICATIONS SYSTEM

1. GENERAL

A. The Contractor is directed to examine each and every section of these specifications, all drawings relating to the Contract Documents, any and all Addenda, etc., for work described elsewhere that may relate to the provision of the work described herein. Materials and performance requirements are specified elsewhere herein that relate to these systems.

B. The use of proprietary or copyrighted names or reference to patented trade items within this specification or elsewhere in the Contract Documents is meant only to establish a standard of quality and performance. In no way does such use establish a restrictive competitive bidding situation, or exclude materials or equipment that is truly equivalent to that required. All materials and equipment proposed for installation must meet or exceed all specified requirements.

2. SCOPE OF THE WORK

A. The Contractor shall furnish all materials, labor, services, purchasing, testing of completely installed systems, etc., that are indicated or required to provide a complete data distribution network for the project.

B. The data distribution network shall be designed and installed in a format and construction equivalent to the Ethernet "1000 Base T" system as it is commonly known and in use throughout the world. It shall be physically wired in a star configuration.

C. The data distribution system shall be installed complete, except as hereinafter described. The system shall be provided with all wall plates, inserts, wiring, equipment racks and supports, copper and fiber termination equipment, connections, wire terminations and identifications, 120 VAC power outlets, grounding etc., for a completely functioning premises wiring network.

D. The system hardware and software shall be installed by the Owner or his vendor, unless otherwise noted or specified.

E. A number of data ports shall be provided, as indicated on the plans. The data ports shall be configured as follows:

   (1) Installed and wired data insert jacks that are connected to the patch panels in individual star home runs.

   (2) Data ports shall be completely ready to receive a connection from data generating or receiving device, enabling such device to run on the network in an unrestricted fashion, meeting all network performance parameters, except as may be limited by the connected device itself.

   (3) Provide single, double, triple, 4-way or other data insert jacks as indicated on the plans. Outlet boxes and conduit runs shall be sized appropriately for 40% fill of conductors used.

   (4) Special Note: In the design and installation of the individual segments, backbones, routing of cable, connections between segments, wiring concentrators, etc., the current conventional 100 meter limitation of physical wiring distance for copper cable shall be observed.

F. The Contractor shall coordinate with any other trades in the furnishing of "mixed service" wallplates, such as voice/data/video and voice/data wallplates. The completed installation shall
be coordinated with all services incorporated into "mixed-service" plates. Contact other suppliers prior to bid or as needed to effect this coordination.

3. TESTING AND WARRANTIES

A. The data distribution network, upon completion of the installation, shall be tested in its entirety. This testing shall completely check each data port from the outlet plate, thru the wiring to the patch panel terminations. Test every data cable (and voice cable, if included).

B. Testing shall encompass all system performance parameters of each port, including attenuation, continuity of wiring to D.C., N.E.X.T. (near end cross talk), cable length, cable I.D., proper pair termination per E.I.A. standards, EMI content, etc., and all significant performance parameters related to Category 6 1000 base T transmission.

C. All of the network cabling that is installed shall be checked after all terminations are complete with an approved test instrument such as a Microtest, Fluke, PentaScanner, or approved equivalent time domain reflectometer instrument. The testing device shall have an inboard memory that is capable of retaining testing parameters and actual results. The Contractor shall provide a printout summary, cable by cable, using the actual cable I.D. to allow future comparison testing or circuit tracing. Provide the printout summaries on 8-1/2" X 11" paper, three complete sets mounted in a 3-ring binder as part of the project's closeout documentation. Submit the printout summaries to the Engineer for review.

D. The test results shall be in a form and format that can be easily understood. The results shall be recorded port by port, identified room by room so the results can be traced and repeated if necessary, or checked for performance drift.

Before labeling any device or port or doing any testing, verify that final room number selections have been made by the Owner! Always use the actual room name/numbering scheme.

E. If network hubs or switches are provided as a part of this contract, the Contractor shall incorporate additional testing to demonstrate the ability of each individual port to make a proper connection thru the selected hub or switch configuration to each designated file server. The Contractor shall provide the necessary equipment and software to accomplish this testing. A testing log similar to that developed from the cable testing shall be provided and bound with the cable testing manuals. This log shall indicate pass-fail for the connection from the port tested to each of the network segments and/or services, along with a comments space indicating corrective actions taken (if needed) and any other information the Contractor wishes to provide to assist the Owner. This information may be included in the cable testing summary manuals, at the Contractor's option.

F. The completed data distribution system, in its entirety, shall be unconditionally warranted for a period of one year from the completion of testing and system acceptance by the Engineer and/or Owner.

4. DATA DISTRIBUTION SYSTEM EQUIPMENT AND PERFORMANCE REQUIREMENTS

A. The cable and connector system shall be capable of operating at up to 1000 megabit/second speed, with capability to handle all currently available bus architectures. It shall be compliant with EIA/TIA568A or B (verify termination style with owner prior to beginning work) Standards, latest version, all Category Six construction.
B. Lengths of cabling shall not exceed the published criteria for this type of system. LAN repeaters shall not be considered or used in cabling design, except where specifically required by this specification.

C. The selection and location of equipment and patch panels shall be made with 15%, or minimum of twenty additional ports for future growth in addition to the ports indicated on the drawings.

D. Patch panels shall be placed in rack construction at indicated or required locations. The Contractor shall indicate the final locations on the project record drawings. Provide for any needed general construction in bid. Patch panels shall be entirely Category Six construction, Lucent Technologies, Panduit, Leviton, Ortronics, AMP or approved equivalent with RJ-45 jacks as needed, maximum 24 jacks per panel, EIA/TIA 568A and B compliant.

E. The Contractor shall evaluate the geography of the building and cable layout prior to bid and satisfy himself that the design intent can be met. The design shall be based on the indicated wiring closet locations as shown. If pre-bid analysis indicates the need for additional equipment, wiring, etc., contact the Engineer 10 days prior to bid for clarification by written addendum.

F. The Contractor is to prepare shop drawings for review prior to purchasing or installing any equipment or wiring. Provide eight sets for review, bound neatly. The review drawings should consist of floor plans indicating all port locations, their style, routings, port address nomenclature, wiring distances, etc. The shop drawing submittal for the system shall include all components, wiring, plates, details, etc., involved in the system.

G. Submit documentation outlining system testing procedures and equipment for review prior to beginning testing. Testing documentation shall include the proposed formats for cable testing or fiber optic as applicable.

H. All system wiring to and from ports is to be Category Six, unshielded twisted pairs. The installation of the wiring shall be thru sleeves, conduit, cable trough and along backboards as indicated on the drawings. The Contractor shall consider the possibility of RFI/EMI in the installation and take all necessary precautions and provide physical separations to ensure proper system performance. Wiring shall be 4 pairs, 22 or 24 AWG, all pairs certified Category Six. If necessary, wiring is to be installed within conduit or other enclosed raceway in plenum ceiling areas. Coordinate all requirements for plenum and non-plenum spaces with other trades and the contract documents or by site verification prior to bidding the work. Cable shall be as specified within these Specifications, Section 260519 - Conductors.

I. All data port insert jacks for outlet boxes shall be installed with all wiring terminated per the manufacturer's recommendations. All data insert jacks shall be Category Six, A.T. & T 110 style with RJ-45 jacks. Products by Ortronics, Lucent Technologies, Panduit, Wiremold, AMP or approved equivalent will be acceptable. See Specifications, Section 262726 - Wiring Devices for specifics.

J. Plates shall be configured for the number of data outlets shown. For certain plates marked voice/data style, provide data port(s), RJ-45 style and Category Six RJ-45 telephone voice jack(s), style as needed by telephone system vendor. Clearly label the "voice" and "data" jacks with black-filled engraved letters, permanent plastic labels, plastic-shielded tags showing the specific drop I.D. number. Additionally, the specified color coding (refer to Specifications Section 262726) shall further identify the jack's function. Coordinate provisions for multi-service plates with each other project supplier (including video systems), prior to bid or as needed after bids, to ensure all needed components are provided in the contract.
K. Provide 120 volt surge-suppressed AC line power to all system equipment whether indicated on the plans or not. Refer to other sections of these specifications for electrical requirements.

L. All system wiring shall be neatly draped, labeled, properly supported and terminated at all locations. Provide permanent labeling indicating room number and address. Each patch panel termination for an individual port and each end of each cable 4” from termination shall be permanently marked on panel front. See other requirements this section (N. below) for more specific labeling information.

M. All system installations shall be made in full compliance with the following:

National Electrical Code
Kentucky Building Code
47 CFR Part 68
NFPA 75
EIA/TIA 568A/B (as required by Owner)
Other EIA and I.E.E.E. Standards that Apply to such Installations
Kentucky Education Technology Standards - Current Version as of Bid Date

N. All cable shall be carefully routed and connected to avoid ground loops and EMI. All racks and equipment enclosures shall be effectively grounded to the nearest ground point provided in electrical spaces. Use only stranded copper, green color wiring, #6 awg minimum for grounds.

O. At the patch panel rack locations, provide a plexiglas framed or shielded permanently-mounted chart showing the cable schedule for the system, highlighted to show the cables (and equipment, as applicable) at that location. This schedule shall include:

(1) Cable Number

Each cable shall have a unique identifier. This number shall be up to 5 characters in length. The first two characters MAY be ALPHA characters, the last three characters MUST be numeric.

(2) Drop ID

The drop id. identifies the cable drop location. This field may be up to six characters in length. This identification shall represent a room number, floor plan grid location, or wiring closet location. Note: It is imperative that the final version of the building room numbering system be utilized in all cable identifications. Verify room numbering system with the Architect or Owner.

(3) Jumper From

This field shall identify whether the drop/grid cable is terminated in THIS wire closet or patched from a device. A drop/grid cable shall terminate on a distribution panel. A patch cable shall jumper from a device unit number.

(4) Termination Point

Grid/riser cable termination point in a rack and panel. This termination is in the DESTINATION wire closet "Jumper From" location.
(5) Length

Cable length in feet.

(6) Jumper To

This field may be up to 11 characters and shall be used to identify the "jumper to" point in THIS wire closet. "Jumper to" may be a device and unit number or distribution panel position.

NOTE: Identify fibre optic cables in similar fashion, as applicable and differentiate their codes by an "FO" prefix.

5. INSTALLATION

A. Provide installation of racks, rack grounding, rack power, etc. Racks shall be secured to concrete floors but moveable by removal of hex nuts. See other drawings related to this contract for any additional electrical provisions or furnish and install as necessary.

B. Provide permanent labeling as shown in the sequence chart.

C. Provide cable/connector/hub testing, as appropriate, to satisfy system installation requirements and verification of proper function.

D. The Cabling System shall be installed in a professional manner by persons skilled in the trades represented and in accordance with local building codes and applicable provisions of B.I.C.S.I., the National Electrical Code (NEC), except where specifications for the system design and specifications exceed these requirements, where the more stringent standard shall apply.

E. All electrical materials and equipment installed shall be of new manufacture, and approved by Underwriters Laboratories, Inc., and shall bear the UL label.

F. Drawings generally indicate work to be done, but do not show all bends, transitions or special fittings required to clear beams, girders, or other work already in place. Contractor shall carefully investigate conditions where wiring conduit and troughs are proposed or installed, and furnish and install any required fittings, offsets, etc. All cutting and patching necessary to install the system shall be provided as a part of this contract, in accord with the established or prevailing standards.

G. Contractor shall install labels as follows:

   (1) One label at each end of each cable at the end of the cable sheath, after stripping, four to six inches from termination.

   (2) One label of port address and/or cable drop I.D. # on the outside of each active outlet plate.

   (3) One label on the front of the patch panel centered below each associated cable connect.

   (4) All markings shall be done in a manner that presents a neat, permanent, professional appearance.

H. Contractor shall bond together cable grounds to distribution rack, and bond rack to building electrical panel ground for ground continuity. Continuity shall be checked with an ohmmeter between adjacent components, to a maximum of one OHM. Provide additional jumpers if necessary. Bond to cable trays within wiring closets, if provided.
I. All cables from overhead wireways shall be neatly dressed behind distribution panels, providing adequate working space in back of the panels, allowing rack movement and working space.

J. Equipment racks shall be grounded to building ground using an appropriate size ground wire (minimum #6 AWG). Route to the nearest available panelboard ground bus, preferably the panel that feeds receptacles at the equipment location. Route the ground wire in E.M.T. conduit, with redundant ground bushings.

K. The equipment racks shall be completely installed before or just as cables are pulled.

Contractor shall use basket grips or other wire pulling apparatus as recommended by the wire manufacturer wherever possible, and exercise care while pulling cable so as not to exceed the maximum allowable pulling strength of any cable.

Contractor shall economize on the use of cable by limiting excess length on runs to one foot at the outlet, and four feet at the distribution panel(s), unless longer lengths are needed to make up terminations with the necessary amount of slack. Leave sufficient slack to allow moving of racks away from wall for easy service access.

L. Insulated throat conduit fittings shall be used for ends of raceway or sleeves at all locations. Provide 5/8" x 4' x 8' high fire retardant plywood backboard(s) as needed at each wiring closet location. Mount ground wire and surge-suppressing ANSI Category "A" 120 volt outlets at bottom of backboard. Provide quadplex outlets as needed (minimum of two), with each quad on a dedicated 20 amp circuit from panel, leaving 25% spare outlets for the Owner's future use.

M. Requirements for grounding, bonding, structural supports, relieving of sharp edges, etc., shall be in accordance with local codes and accepted building practices.

N. Cable Separation from Power Wiring: (Note: These are recommended guide distances only. The Contractor is responsible for minimizing RFI/EMI problems in the wiring and equipment installations to the point that they do not affect system performance.)

(1) The following distances are a guide for separation of data wiring from power voltages up to 480 volts:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Shielded</th>
<th>Unshielded</th>
<th>Unshielded enclosed in grounded conduit</th>
<th>Power lines with grounded metallic sheath enclosed in conduit</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2kva</td>
<td>2.5 in.</td>
<td>39 in.</td>
<td>5 in.</td>
<td>5 in.</td>
</tr>
<tr>
<td>2-5kva</td>
<td></td>
<td>48 in.</td>
<td>12 in.</td>
<td>6 in.</td>
</tr>
<tr>
<td>&gt;5kva</td>
<td></td>
<td></td>
<td>24 in.</td>
<td>12 in.</td>
</tr>
</tbody>
</table>

(2) Between the data wiring and any fluorescent, neon, or high intensity discharge (HID) lamp fixtures, the minimum clearance shall be six inches, or greater if recommended by the cable or hardware vendors.

(3) Cables may be installed closer to lighting and convenience outlet power cables (single phase 120V, 20A. maximum), in metal cable channels for limited distances, if the following are observed:
- Parallel runs of no more than fifteen feet are permissible if a one inch separation between the power cable and the data cable is maintained by separators or suitable retention hardware.

- Parallel runs of no more than thirty feet are permissible if a two inch separation is maintained. The separation may be less than two inches for a run of up to twelve inches, if no contact occurs between the data cable and the power cable.

(4) Contractor shall correct the dress of all cables which malfunction due to proximity to power cable, or other interference source revealed by checking or electronic network testing.

(5) **Contractor to verify all listed cable clearances with the system supplier prior to installing any cable and perform his work in accord with the suppliers' requirements.**

(6) **Project Completion**

Contractor's work shall be considered complete after the following has been accomplished:

a. Installation is complete, all system testing has been completed and Contractor certifies in writing that the entire system is in working order.

b. All system labels have been put in place.

c. All construction debris and scrap materials have been removed from the premises.

d. All marked up record drawings have been returned to the Engineer.

e. All unused materials have been returned to the Owner, as Owner directs.

f. The Engineer has accepted the installation.

g. The Owner and/or his equipment vendor have accepted the system wiring in its entirety in writing. Forward a copy of this communication to the Architect and Engineer for their records.

h. The testing logs (3 copies, bound) have been forwarded to the Engineer.

END OF SECTION 270610
SECTION 283100 - FIRE ALARM SYSTEM

1. GENERAL

A. SCOPE AND RELATED DOCUMENTS

(1) The work covered by and the intent of this section of the specifications includes the furnishing of all labor, equipment, materials, testing, programming and performance of all operations in connection with the installation of the Fire Alarm System as shown on the drawings, as herein specified and as required by the applicable codes.

(2) The requirements of all other applicable conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.

(3) The complete installation shall conform to the applicable sections of NFPA-71, NFPA-72A, B, C, D, Local Code Requirements and National Electrical Code (Article 760). The requirements of any local fire department and the Authority Having Jurisdiction shall also be observed in the system installation and device layout.

(4) The work included in this section shall be coordinated with related work specified elsewhere in these specifications.

B. QUALITY ASSURANCE

(1) Every component, device, transmitter, software, etc., that are included in the work, to make up a complete Fire Alarm System shall be listed as a product by the manufacturer under the appropriate category by the Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label.

(2) The system power, signal and controls wiring shall be UL listed for Power Limited Applications per NEC 760. All circuits shall be marked in accordance with NEC Article 760.

C. GENERAL

(1) Furnish and install a complete digital multiplex Fire Alarm System as described herein and as shown on the plans; to be wired, connected, completely tested, and left in first class operating condition. The system shall use individually-addressable digital multiplex device circuit(s) with individual device supervision, appliance circuit supervision, incoming normal and stand-by power supervision. In general, systems shall include a control panel, manual pull stations, automatic fire detectors, horns, flashing lights, annunciator (if indicated), raceways, all wiring, connections to devices, connections to valve tamper switches, water flow switches and mechanical controls, outlet boxes, junction boxes, and all other necessary materials for a complete, operating system.

The fire alarm control panel shall allow for loading or editing of any special instructions or operating sequences as required. No special tools, modems, or an off-board programmer shall be required to program the system to facilitate future system expansion, building parameter changes, or changes as required by local codes. All instructions shall be stored in a resident non-volatile programmable memory.

(2) All panels and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name of each component. Any catalog numbers specified...
under this section are intended only to identify the type, quality of design, materials, and operating features desired.

The listing of specific catalog numbers and equipment parameters is not intended to limit competition among other manufacturers that propose to supply equivalent equipment and services. Fire alarm systems are to be expansion of existing system.

(3) Equipment submissions for shop drawing review must include a minimum of the following:

a. Complete descriptive data indicating UL listing for all system components.

b. Complete sequence of operations of the system.

c. Complete system wiring diagrams for components capable of being connected to the system and interfaces to equipment supplied by others.

d. A copy of any state or local Fire Alarm System equipment approvals.

e. An Autocad (latest version) produced wiring diagram illustrating the basic floor plan of the building, showing all system wiring and equipment, as well as zoning boundaries and schedule of zone legends as intended to appear on annunciators. Provide three CD-Rom copies of as-built drawings and all system operational software at close of project, to be included in operation and maintenance manuals.

(4) No work shall be done until the drawings are approved by the Kentucky Department of Housing, Buildings and Construction.

D. OPERATION

(1) The system alarm operation subsequent to the alarm activation of any manual station, automatic detection device, or sprinkler flow switch shall be as follows:

a. 1) The appropriate initiating device circuit indicator (red color) shall flash on the control panel until the alarm has been silenced at the control panel. Once silenced, this same indicator shall latch on. A subsequent alarm received after silencing shall flash the subsequent zone alarm indicator on the control panel and resound alarms and flashing signals. These same conditions shall occur at any remote annunciator.

2) A pulsing alarm tone shall occur within the control panel until silenced.

b. All alarm indicating appliances shall sound in a temporal code pattern until silenced by an alarm silence switch at the control panel (or the remote annunciator, if any).

c. All doors normally held open by door control devices shall close. Doors shall also be released in the event of incoming normal power failure.

d. A supervised signal to notify the local fire department or an approved central station (as required by local codes) shall be activated.

e. A supervised signal shall directly activate, shut down or reconfigure the air handling systems as required by NFPA or as otherwise indicated herein. Provide necessary interlock wiring as required to control mechanical equipment.
f. The Contractor(s) shall coordinate with each other as necessary to provide all required auxiliary contacts, DDC systems interfaces, equipment, etc., as needed to shut down or otherwise control air handling systems per NFPA and all applicable codes.

g. The system shall be wired with two circuits to all Notification devices so that when an alarm is acknowledged, silencing the audibles, the visual units shall continue in operation until the main control panel has been reset. If local codes require other than this arrangement, the system shall be wired in accordance with the code that is applicable.

(2) The alarm indicating appliances shall be capable of being silenced only by authorized personnel operating the alarm silence switch at the main control panel or by use of a similar key operated switch at the remote annunciator (where remote units are provided). A subsequent alarm shall reactivate the signals. Operation of the alarm silence switch shall be indicated by trouble light and audible signal.

(3) The alarm activation of any elevator lobby shaft, pit or equipment room smoke detector shall, in addition to the operations listed above, cause the elevator cabs to be recalled according to the following sequence:

a. If the alarmed detector is in any location or on any floor other than the main level of egress, the elevator cars shall be recalled to the main level of egress.

b. If the alarmed detector is on the main egress level elevator lobby, the elevator cabs shall be recalled to the pre-determined alternate recall level.

c. Provide auxiliary contacts within the base of each elevator lobby smoke detector, with each separate landing to be wired back separately to the elevator controller. Coordinate all equipment terminations and sequence of operation with the elevator installer. The use of digital to analog controllers to accomplish this function will be acceptable, if in compliance with codes.

d. Provide heat detectors within 12" of each sprinkler head where they are installed in elevator equipment rooms, shafts or pits, in accordance with code. The temperature rating and wiring of the detectors shall be coordinated with the sprinklers, per ANSI Elevator Code and NFPA. Wire to interrupt elevator power per the applicable code.

(4) The activation of any standpipe water valve tamper switch or sprinkler zone valve tamper switch shall activate a distinctive system supervisory audible signal and illuminate a "Sprinkler Supervisory Tamper Switch" indicator at the system controls (and the remote annunciator[s]). There shall be a distinction in the audible trouble signals between valve tamper switch activation and opens or grounds on fire alarm circuit wiring.

a. Activating the trouble silence switch will silence the supervisory audible signal while maintaining the "Sprinkler Supervisory Tamper" indicator showing the tamper contact is still activated.

b. Restoring the valve to the normal position shall cause the audible signal and visual indicator to pulse at a fixed rate.

c. Activating the trouble silence switch shall silence the supervisory audible signal and restore the system to normal.

(5) Include with the control panel, as an auxiliary function, a built-in test mode that, when activated, will cause the following operation sequence:
a. The city connection circuit shall be disconnected.

b. Control relay functions shall be bypassed.

c. The control panel shall show a trouble condition.

d. The panel shall automatically reset itself.

e. Any momentary opening of an initiating or indicating appliance circuit shall cause the audible signals to sound for a minimum of two seconds to indicate the trouble condition.

(6) A manual evacuation switch shall be provided to operate the system indicating appliances and/or initiate "Drill" procedures.

(7) Activation of an auxiliary bypass switch shall override the automatic functions either selectively or throughout the system and initiate a trouble condition at the control panel.

(8) Include any and all detection equipment and interface relays as required to provide a 100% code approved and supervised pre-action Fire Suppression system. Coordinate with the Fire Protection installer as required.

E. SUPERVISION

(1) The system shall contain Class "B" (Style "B") independently supervised initiation circuits as required for the zoning indicated. Circuits shall be arranged so that a fault in any one zone shall not affect any other zone. The alarm activation of any initiation circuit shall not prevent the subsequent alarm operation of any other initiation circuit.

(2) There shall be supervisory initiation circuit(s), as required, for connection of all sprinkler valve tamper switches. Wiring methods which require any fire alarm initiation circuits to perform this function shall be deemed unacceptable; i.e., sprinkler and standpipe tamper switches (N/C contacts) shall NOT be connected to circuits with fire alarm initiation devices (N/O contacts). These independent initiation circuit(s) shall be each labeled "Sprinkler Supervisory Tamper Switch" and shall differentiate between tamper switch activation and wiring faults. Provide individual annunciation for the main post indicator valve and each tamper switch as indicated by the zoning schedule on the plans or as otherwise required by codes. For these circuits and all exterior underground copper circuit wiring, provide proper surge suppression and protection for circuit.

(3) There shall be independently supervised and independently fused indicating appliance circuits as required for alarm audible signals and flashing alarm lamps.

(4) All auxiliary manual controls shall be supervised so that all switches must be returned to the normal (automatic) position to clear system trouble.

(5) Each independently supervised circuit shall include a discrete (amber color) "Trouble" indicator to indicate disarrangement conditions, per each circuit.

(6) The incoming power to the system shall be supervised so that any power failure shall be audibly and visually indicated at the control panel and the annunciator. A green color "power on" indicator shall be displayed continuously while incoming power is present.
(7) The system batteries shall be lead-acid type, supervised so that disconnection or failure of a battery shall be audibly and visually indicated at the control panel (and the annunciator).

(8) Wiring to a remote annunciator (if provided for system) shall be supervised for open and ground conditions. An independent annunciator trouble indicator shall be activated and an audible trouble signal shall sound at the control panel.

F. POWER REQUIREMENTS

(1) The control panel shall receive 120 VAC power via a dedicated circuit. The incoming circuit shall have suitable overcurrent protection within the control panel, as well as at the circuit source. If additional circuits are required for this or other control units, they shall be provided by the Contractor.

(2) If the facility is equipped with an emergency standby power generator, the fire alarm equipment shall be connected to this system, per N.E.C.

(3) The system control panel and auxiliary equipment, such as power supplies shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of time as required by codes for the building occupancy. There shall be reserve battery capacity to drive all alarm appliances for five minute indication at the end of this period. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operating shall be automatic. Batteries, once discharged, shall recharge at a rate that will provide a minimum of 70% capacity in 12 hours, or sooner if required by codes.

(4) All circuits requiring system operating power shall be 24 VDC and shall be individually fused at the control panel.

(5) Power supplies for Notification signals, whether in the main panel or within remote power supply cabinets, shall be designed to provide a minimum of 20% spare capacity for future signals.

G. FIRE ALARM CONTROL PANEL

(1) Where shown on the plans, provide and install the Fire Alarm Control Panel. Construction shall be modular with solid state, microprocessor based electronics. All visual indicators shall be high contrast, light-emitting diode type.

(2) The control panel shall contain the minimum following features as per plans:

- Minimum Capacity of 120 Control or Monitor Points or greater, to Suit Building Requirements, expandable to 1000 points
- Initiation Device Circuits
- Alarm Indicating Appliance Circuit
- Supervised Annunciator Circuits
- Local Energy City Connection, if required
- Form C Alarm Contacts (2.0 Amps ea., minimum of two unless otherwise required)
- Earth Ground Supervision Circuit
- Automatic Battery Charger, of proper rating
- Standby Battery, Lead/Acid Type
- Resident non-volatile programmable operating system for all operating requirements
- Supervised Manual Evacuation Switch
- Internal power supplies as required for auxiliary functions as indicated
- Auxiliary contacts or relays for auxiliary functions as indicated
- All Custom Software and Programming as required to suit the project requirements

H. SYSTEM SOFTWARE AND PROGRAMMING

(1) Provide all programming and software necessary to place annunciators and controls in full operation. System set-up shall allow for changes in annunciator legends without rewiring or addition of programming or electronics. Furnish initial programming and reprogramming as needed to accommodate changes in the system up to the time of system acceptance by the engineer without extra charge.

I. REMOTE ANNUNCIATOR

(1) Where indicated on the plans, provide and install annunciator/control panel. The panel shall be of vandal-resistant construction and shall contain a liquid crystal illuminated display for alphanumeric indication of all required functions. The panel shall also contain the following control functions, activated by a master system enable key switch on front panel:

a. Remote system reset switch, to complement main control panel reset switch.

b. Remote alarm signal silence switch.

c. Remote manual evacuation switch, to initiate fire drill functions, same as at main control panel.

d. Remote trouble silence switch to silence trouble alarms in annunciator panel and main control panel.

e. Install panel on properly sized outlet box, 54" AFF to centerline. Panel shall contain tamper-resistant LED test switch in panel, local audible alarm, system power on, trouble LED indicators and master system enable key switch, keyed alike with the main control panel.

(2) Annunciator legends shall be custom, to display both zone number and brief legend indicating the area or device associated with that zone. The legends shall be electronically generated on an alphanumeric display panel. The fire alarm system vendor shall coordinate the legends with the Engineer at shop drawing review.

(3) Wiring between main control panel and annunciator(s) shall be fully supervised, and accomplished over twisted shielded pair and/or THWN wiring as required by the manufacturer, per N.E.C. and NFPA.

J. PERIPHERAL DEVICES

Note: On fully digital multiplex systems, provide addressable devices, bases or modules for devices listed herein. Each device shall be an individual address on the system. Addressable bases or modules shall be U.L. listed for the device served.

(1) MANUAL PULL STATION

a. Manual stations shall be double action and shall be constructed of high impact, red lexan or cast metal with raised white lettering and a smooth high gloss finish. The manual pull
station shall have a hinged front with key lock. Stations shall be keyed alike with the fire alarm control panel. When the station is operated, the handle shall lock open in a protruding manner. Furnish one key for each manual station to owner at close of project, during instruction period. Install within 60" of each exit, per code, whether indicated on the drawings or not.

(2) CEILING-MOUNTED SMOKE DETECTORS, PHOTOELECTRIC TYPE

a. Furnish and install where indicated on the plans or required, ceiling-mounted smoke detectors. Provide separate outlet-box mounted base with auxiliary relay, or standard base, as required.

b. Smoke Detectors shall be listed to U.L. Standard 268 and shall be compatible with their control equipment. Detectors shall be listed for this purpose by Underwriters' Laboratories, Inc. The detectors shall obtain their operating power from the fire alarm panel supervised detection loop. Loss of the operating voltage shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal to be generated at the control panel. Detectors shall be capable of being reset at the main control panel.

c. No radioactive materials shall be used. Detector construction shall provide mounting base with twist-lock detector head. Contacts between the base and head shall be of the bifurcated type using spring-type, self-cleaning contacts. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control panel. Detector design shall provide full solid state construction, and compatibility with other normally open fire alarm detection loop devices such as heat detectors, pull stations, etc.

d. To minimize nuisance alarms, voltage and RF transient problems, suppression techniques shall be employed as well as a smoke verification circuit and an insect screen. The detector head shall be easily disassembled to facilitate cleaning.

e. Remote LED alarm indicators shall be installed where required.

f. Smoke detectors (and all other system electronics) shall be shielded to protect circuitry from EMI problems generated by power fields, cellular phones, etc.

g. Special Note: The Contractor installing smoke detectors shall use care in the final positioning of all devices. They shall not be installed closer than 36" from an air diffuser or return grille, closer than 24" from a ceiling/wall intersection, or similar location that would diminish detector performance. Refer to and comply with NFPA 72E, "Standard On Automatic Fire Detectors".

h. Provide smoke detector at each fire alarm system control component, as required by code.

(3) AUTOMATIC HEAT DETECTORS (RATE-OF-RISE TYPE)

a. Automatic heat detectors shall be combination rate-of-rise and fixed-temperature type. When the fixed-temperature portion is activated, the units shall be non-restorable and give visual evidence of such operation. Heat detectors shall be 135, 165 or 195°F, as indicated on plan. Where not indicated, provide 165°F units. Provide as indicated or required.
(4) AUTOMATIC HEAT DETECTORS (FIXED TEMPERATURE TYPE)

a. Where indicated on the plans, provide automatic heat detectors of the non-restorable type, of the temperature rating as indicated or required. Detector heads shall be mounted to an outlet-box mounted base. Provide auxiliary contacts as needed. Provide as indicated or required.

(5) AUDIBLE AND VISUAL UNITS

a. Audible signals shall be polarized and shall be operated by 24 VDC. Each audible assembly shall include separate wire leads for in/out wiring for each leg of the associated signal circuit. T-tapping of signal device conductors to signal circuit conductors will not be accepted. The audible visual units shall be equipped with a xenon-type strobe which shall be semi-flush mounted on 4" square outlet box. Each audible device shall produce a minimum sound pressure level of 92db at 36" on axis. Provide units as manufactured by Wheelock, Inc., or approved equivalent. Locate as indicated or required. All audible tones for same function shall be identical, per NFPA. Provide sufficient audible units to comply with code for required coverage. Provide temporal coded signals.

b. The output intensity of all visual units, their locations and mountings shall be in compliance with the latest version of the Americans with Disabilities Act requirements.

c. Audible units and visual units shall be wired to separate Notification circuits, allowing for silencing of audibles with alarm acknowledgment, continuing operation of strobes until system reset. Addressable devices may be used to fulfill this requirement.

d. Provide system-wide synchronization of all visual devices, so that all strobes flash at the same rate and at the same time, complying with A.D.A.

(6) VISUAL UNITS

a. Stand-alone visual indicating units shall be xenon type strobe matching audio-visual units. These devices shall be UL listed and be or wall mounted. A high-impact clear lens shall project out from backplate. Lettering, if any, shall be oriented upright to the standing viewer. Candela output values of all visual units shall be selected for the covered spaces geometry and size, complying with A.D.A. and NFPA.

(7) DOOR HOLDERS

a. Magnetic door holders shall be 24 volt A.C., and shall have an approximate holding force of 25 lbs or greater, if required to restrain door. The door-mounted portion shall have a plated steel pivot mounted armature with shock absorbing bearing. Unit shall be capable of being either surface, flush, semi-flush or floor mounted as required. Door holders shall be UL listed for their intended purpose. Where door mounted, locate armature 6" down from top and 6" in from strike side of leaf. Where door swing prevents direct contact between armature and holder pole piece, provide non-removable plated chain to close gap as tightly as possible. Verify holder positioning with Architect prior to mounting any devices. Unless otherwise indicated, provide semi-flush mounted holders 6" below top of door leaf as noted above, with blocking in wall to support force of door impact against holder and outlet box. Provide at all needed locations as indicated or required. Coordinate with architectural hardware schedule, as applicable to project.
(8) DUCT SMOKE DETECTORS

a. Duct smoke detectors shall be of the solid state photoelectric type, operating on the light scattering photodiode principle. The detectors shall ignore invisible airborne particles or smoke densities that are below the set alarm point. No radioactive materials shall be used. The basic construction of duct smoke detectors shall be the same as that previously described for ceiling-mounted smoke detectors. Duct housing couplings shall be slotted to insure proper alignment of the sampling and exhaust tubes. Detector shall have an alarm status LED visible through a transparent cover, panel or in housing.

b. The Contractor shall furnish air duct smoke detectors with template to the sheetmetal or air handling unit installer for installation. Coordinate length of sampling probe required and furnish appropriate length. Probe tube shall be located in accord with manufacturer's recommendations, to give maximum sampling rate of airflow. Provide multiple detectors, as required, if a single device will not provide adequate sensing due to duct size or air velocity. Wire multiple detectors on a single air handling system as a single zone or address unless otherwise required by prevailing codes. Field verify quantity of detectors needed to provide NFPA-compliant coverage of the air handling unit and provide as required.

c. Detector supervised power and alarm wiring (from F.A. control panel) is to be provided by the Contractor. Interlock wiring from auxiliary contacts to stop or otherwise control air handling unit fan motor(s) is to be provided by the Contractor. Provide auxiliary contacts as required. Zone wiring and indication for air duct smoke detectors shall be maintained separate from area detection devices. Detector shall be capable of being reset at the main control panel, and at a local test/reset station.

d. Where air duct smoke detectors are located in other than Mechanical Rooms or in spaces not easily visible, a remote alarm/power indicating LED key reset station shall be installed. These remotes shall be ganged together, if required, and labeled accurately as to which unit is reporting an alarm condition.

e. Where air duct smoke detectors are indicated to be furnished at concealed air handling units above ceilings or smoke damper locations, furnish as outlined above. Also provide remote indicating alarm LED flush in corridor wall at 7'-0" A.F.F. immediately below installation, or as close as practical to installation. The Contractor is to provide control wiring, E.P. switches, etc., as required to operate smoke dampers, as well as the required operating circuit. Coordinate all requirements with the installer of smoke dampers.

f. Ionization - type detectors shall not be utilized for air duct smoke detection.

g. All air duct smoke detector installations and materials shall be in accord with U.L., NFPA, and any other applicable codes.

(9) WEATHERPROOF DEVICES AND EXPLOSION-PROOF DEVICES

a. Where the anticipated atmosphere or installation conditions require weather-proof, explosion-proof or other specially housed devices, they shall be U.L.-listed and NFPA-compliant and provided as indicated or required. Verify installation conditions and indicate type of device on shop drawing submission.

(10) END OF LINE RESISTOR
a. End-of-line devices (if required) shall be flush-mounted, located at 7'-0" A.F.F. in corridor walls or as indicated.

(11) GUARDS FOR DEVICES

a. Where detectors, manual stations, signals, etc., require or are indicated to be furnished with a guard, utilize a U.L. listed unit, compactly covering and compatible with the device. Provide as indicated or required. Guards shall not diminish the performance of any device.

(12) DIGITAL ALARM COMMUNICATOR/TRANSMITTER

a. Provide a U.L.-listed and NFPA-compliant digital alarm communicator/transmitter (D.A.C.T.). Install at telephone terminal board or telephone service entrance and provide supervised wiring to fire alarm control panel as required. This unit may be semi-flush mounted at the F.A.C.P. location with prior approval by the Engineer. It may also be integrated within the main control panel, if U.L.-listed for the purpose.

b. The installation and connection of the D.A.C.T. shall be in compliance with all provisions of N.F.P.A. 71 and all other applicable codes. The installation and connection shall be acceptable to the Authority Having Jurisdiction, as well as the telephone company (or companies) over whose lines the signal(s) will be transmitted. Include any costs associated with telephone company work and services required in bid. Telephone connection shall be in compliance with NFPA 71, chapter five.

c. The D.A.C.T. shall be capable of transmitting all information relative to system status changes due to alarm, trouble, water flow, and any other information as required by current codes applicable to the facility. This information shall be transmitted to a U.L. listed Central Receiving Station, that also is maintained in accord with the requirements of NFPA 71. Connect system to transmit signals as required by local codes.

d. As a part of this contract, the services of a Central Receiving Station shall be engaged for a period of one year from the date of substantial completion, this date as defined elsewhere in these documents. The Central Receiving Station facility selected shall be in full compliance with NFPA and other applicable requirements. The Contractor shall initiate this service, provided on a contract basis, and shall include any costs associated with this provision in his bid. The actual beginning date of the contract with the central receiving station may be adjusted at the discretion of the Engineer, but in no case shall be for less than one year. The contractor shall notify the owner in writing by certified mail that this service has been contracted for and explain the provisions of this service adequately. A copy of this communication and the return receipt shall be forwarded to the Architect and the Engineer.

(13) REMOTE POWER SUPPLY UNITS FOR PERIPHERAL

a. Provide remote power supply(ies) as required for proper system operation.

b. Remote power supplies shall be provided with local intelligence compatible with the digital multiplex network, so they have a unique address, providing the ability to monitor the supply for loss of power, shorts, grounds and other supervisory functions.

c. Where required by the fire alarm system manufacturer, remote power supplies shall be provided that will provide sufficient current to drive audio/visual or other required devices.
d. These units shall be located in electrical closets, mechanical rooms or similar spaces. They shall not be installed in finished areas, storage rooms, etc., without the permission of the Engineer. All locations shall be indicated on the shop drawing submissions.

e. Provide dedicated 120 volt power circuit(s) from nearby panelboards as required, whether indicated on the plans or not.

K. INSTALLATION

(1) Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be in a completely separate conduit system from power wiring or other raceway systems. Minimum conduit size shall be 3/4” trade size. Maximum wire fill shall be 40%, for any raceway system.

All junction boxes shall have coverplates painted red and labeled "Fire Alarm". A consistent wiring color code shall be maintained throughout the installation. The number of wiring splices shall be minimized throughout. Excessive wire splicing (as determined by the Engineer), shall be cause for rejection of the work.

(2) Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate tradesmen or other contractors.

(3) The Contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of installation.

(4) The manufacturer's authorized representative shall provide on-site supervision of installation, and shall perform the initial "power-up" of the system after he has thoroughly checked the installation.

(5) Operation and maintenance manuals submitted for this project shall list names, license numbers, and telephone numbers of at least two installers that are employed full time by the supplier/manufacturer to install and test fire alarm systems in the installation location.

A floor plan drawing indicating fire alarm devices and wiring only, shall be provided by the manufacturing company for job site use. These drawings shall be approved by the State Fire Marshal's Office or Local Authority Having Jurisdiction, as appropriate and in accord with code requirements. A copy of this drawing shall be submitted to the Engineer for his review, approval and project records.

L. TESTING

(1) The completed fire alarm system shall be fully tested in accordance with NFPA-72H by the contractor in the presence of the Owner's representative and the Local Fire Marshal. Upon completion of a successful test, the Contractor shall certify the test results in writing to the Fire Marshal, Owner, General Contractor, Architect and Engineer. Provide one week's written advance notice of the test to all concerned parties.

(2) All auxiliary devices the fire alarm system is connected to, including tamper switches, flow switches, elevator controls, remote receiving stations, etc., shall be fully tested for proper operation where interfacing with the fire alarm system.
(3) The Contractor shall provide a minimum of three hours of instructional time to the Owner in the operation and maintenance of all equipment and components. A receipt shall be obtained from the Owner that this has been accomplished, and a copy forwarded to the Engineer. Provide additional training time if required by the Owner at no charge to the contract or as direct charge to the Owner.

M. WARRANTY

(1) The Contractor shall unconditionally guarantee (except for vandalism or misuse) the completed fire alarm system wiring and equipment to be free from inherent mechanical, software and electrical defects for a period of one year from the date of substantial completion.

(2) The equipment manufacturer shall make available to the Owner a maintenance contract proposal to provide a minimum of two inspections and tests per year in compliance with NFPA-72H guidelines.

END OF SECTION 283100
SECTION 321723 - PAINTED PAVEMENT MARKINGS

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. “Red Box” Markings

1.02  REFERENCE STANDARDS
   A. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective; Rev. D, 2007.

1.03  SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Manufacturer's data sheets on each product to be used, including:
      1. Preparation instructions and recommendations.
      2. Storage and handling requirements and recommendations.
      3. Installation methods.
   C. Certificates: Submit for each batch of paint and glass beads stating compliance with specified requirements.

1.04  DELIVERY, STORAGE, AND HANDLING
   A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
   B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.
   C. Store products in manufacturer's unopened packaging until ready for installation.
   D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.05  FIELD CONDITIONS
   A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2  PRODUCTS

2.01  MATERIALS
   A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.
      1. Red Box Markings: Red
   B. Paint For Obliterating Existing Markings: FS TT-P-1952; black for bituminous pavements, gray for portland cement pavements.
   C. Reflective Glass Beads: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing coating to ensure free flow.
   D. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.
PART 3 EXECUTION

3.01 PREPARATION

A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

F. Temporary Pavement Markings: When required or directed by Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
   1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
   2. At Contractor's option, temporary marking tape may used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

3.02 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.
   1. Apply paint in two coats for permanent applications. Apply one coat only for temporary striping applications.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Length Tolerance: Plus or minus 3 inches.

G. Use suitable mobile mechanical equipment that provides constant agitation of paint and travels at controlled speeds.
   1. Conduct operations in such a manner that necessary traffic can move without hindrance.
   2. Place warning signs at the beginning of the wet line, and at points well in advance of the marking equipment for alerting approaching traffic from both directions. Place small flags or other similarly effective small objects near freshly applied markings at frequent intervals to reduce crossing by traffic.
3. If paint does not dry within expected time, discontinue paint operations until cause of slow drying is determined and corrected.

4. Skip Markings: Synchronize one or more paint "guns" to automatically begin and cut off paint flow; make length of intervals as indicated.

5. Use hand application by pneumatic spray for application of paint in areas where a mobile paint applicator cannot be used.

6. Distribute glass beads uniformly on the paint lines within ten seconds without any waste, applied at rate of 6 pounds per gallon of paint; if the marking equipment does not have a glass bead dispenser, use a separate piece of equipment adjusted and synchronized with the paint applicator; remove and replace markings having faulty distribution of beads.

3.03 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to Owner.

END OF SECTION