PROJECT MANUAL
ISSUED FOR BIDS: September 19, 2023

University Center at MCC
for
McHenry County College
8900 U.S. Hwy 14
Crystal Lake, IL 60012

DEMONICA KEMPER ARCHITECTS
125 N. Halsted Street, Suite 301
Chicago, Illinois 60661
P 312.496.0000
F 312.496.0001

DKA Project Number: 22-050
MCC Project Number: RFP230919
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SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

1.1 BID INFORMATION

A. Sealed Bids will be received by McHenry County College, on or before October 17, 2023, at 9:30 a.m., prevailing time for the University Center at MCC for McHenry County College.

B. Lump sum bid proposals will be received for this project at the scheduled time of receipt of bids and will be publicly opened there after in Board Room A217.

C. Bid security in the form of a bid bond, certified check, or cash in an amount equal to ten percent (10%) of the base bid amount shall be submitted with the bid. Should a bid bond be submitted, the bid bond shall be payable to the Board of Trustees, McHenry County College.

D. Bids shall be submitted on or before the specified closing time in an opaque sealed envelope addressed to: Mr. James Julison, Director for Business Services, 8900 US Hwy 14, Building A, Room A248, Crystal Lake, Illinois 60012

E. A MANDATORY Pre-Bid Meeting will be held on September 29, 2023, at 9:30 a.m., at the project site, 222 E. Church Street, Woodstock, IL 60098. Representatives from the College and the Architect’s office will be present to answer questions regarding bidding procedures and project requirements.

F. The College reserves the right to reject any or all bids or parts thereof, or waive any irregularities or informalities, and to make the award in the best interest of the College. Decisions of the College will be final.

G. Minority and Women Owned Businesses are highly encouraged to participate.

H. Bidding documents are on file and may be obtained through the following link: www.mchenry.edu/bid/.

I. This Contract calls for the construction of a “public work,” within the meaning of the Illinois Prevailing Wage Act, 820 ILCS 130/.01 et seq. (“the Act”). The Act Requires contractors and subcontractors to pay laborers, workers and mechanics performing services on public works projects no less than the “prevailing rate of wages” (hourly cash wages plus fringe benefits) in the county where the work is performed. For information regarding current prevailing wage rates, please refer to the Illinois Department of Labor’s website at: http://www.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx. All contractors and subcontractors rendering services under this contract must comply with all requirements of the Act, including, but not limited to, all wage, notice, record keeping duties, and related Equal Employment Opportunity Laws. Failure to comply with said Act will result in penalties and fines.

J. All questions regarding any matter concerning this Invitation to Bid must be submitted in writing to Mr. David Sikorski, Demonica Kemper Architects. Questions must be emailed to dsikorski@dka-design.com, with “University Center at MCC” in the subject line. No questions will be addressed after 5:00 PM (CST), on October 11, 2023.

END OF SECTION 00 11 13
SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

Sealed proposals are invited for the University Center at MCC for McHenry County College pursuant to specifications. Contractors who do not submit a bid or who do not respond with a "no bid" will be removed from our contractor list for this item.

PROPOSALS:
Proposals will be received at the place, date, and time hereinafter designated.

PLACE: McHenry County College
Room A248
8900 US Hwy 14
Crystal Lake, IL 60012

DATE: October 17, 2023
TIME: 9:30 a.m. prevailing time (FAXES ARE NOT ACCEPTABLE)

Proposals received after this time will not be accepted.

Proposals must be made in accordance with the instructions contained herein. They shall be submitted on the forms furnished in a sealed envelope, plainly marked, with the Bidder's Name and Address and the notation:

BID: University Center at MCC
McHenry County College

Bids will be publicly opened and read aloud on October 17, 2023, following the receipt of bids in Board Room A217.

TAX EXEMPTION:
McHenry County College is exempt from Federal, State, and Municipal taxes.

SIGNATURE ON BIDS: McHenry County College requires the signature on bid documents to be that of an authorized representative of said company.

Each bidder, by making his bid, represents that he has read and understands the bidding documents and that these instructions to bidders are a part of the specifications.

BIDDING PROCEDURES:
No bid shall be modified, withdrawn, or cancelled for ninety (90) days after the bid opening date without the consent of the College Board of Trustees.

Changes or corrections may be made in the bid documents after they have been issued and before bids are received. In such case, a written addendum describing the change or correction will be issued by the College to all bidders of record. Such addendum shall take precedence over that portion of the documents concerned, and shall become part of the bid documents. Except in unusual cases, addendum will be issued to reach the bidders at least five (5) days prior to date established for receipt of bids.

Each bidder shall carefully examine all bid documents and all addenda thereto, and shall thoroughly familiarize themselves with the detailed requirements thereof prior to submitting a proposal. Should a bidder find discrepancies or ambiguities in, or omissions from documents, or should they be in doubt as to their meaning, they shall, at once, and in any event, not later than ten (10) days prior to bid due date, notify the College who will, if necessary, send written addendum to all bidders. The college will not be responsible for any oral instructions. After bids are received, no allowance will be made for oversight by bidder.
Bidders shall submit three (3) complete copies (one original and two copies) of the Bid Forms including the following documents:

1. Document 00 41 13 - Bid Form
2. Document 00 43 13 – Bid Bond
3. Document 00 43 15 - Contractor Certification
4. Document 00 43 29 - W-9
5. Document 00 43 39 - Business Enterprise Program Participation and Utilization Plan
6. Document 00 43 43 – Certificate of Compliance with Illinois Prevailing Wage Law
7. Document 00 44 00 - Substitution Sheet

SITE EXAMINATION:
Bidder shall examine the project site before submitting a bid. A visit to the project site may be arranged for Bidders by contacting Mr. Dave Dammon, Vice President for Physical Facilities, (815) 455-8564.

A MANDATORY Pre-Bid Meeting will be held on September 27, 2023, at 9:30 a.m., at the project site, 222 E. Church Street, Woodstock, IL 60098. Representatives from the College and the Architect’s office will be present to answer questions regarding bidding procedures and project requirements.

SUBSTITUTIONS:
Each bidder represents that his bid is based upon the materials and equipment described in the bidding documents. Any dealer bidding an equal product must specify brand name, model number, and supply specifications of product. The Board shall be the sole judge of whether an article shall be deemed to be equal. A bidder’s failure to meet the minimum specifications as listed may result in disqualification of his bid.

REJECTION OF BIDS: The bidder acknowledges the right of the College Board to reject any or all proposals and to waive informality or irregularity in any proposal received and to award each item to different bidders or all items to a single bidder. In addition, the bidder recognizes the right of the College Board to reject a proposal if the proposal is in any way incomplete or irregular. The College Board may also award, at its discretion, only certain items quoted on. The College Board also reserves the right to reject the proposal of a Bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or a bid of a Bidder when investigation shows that Bidder is not in a position to perform the contract.

ACKNOWLEDGEMENT OF ADDENDA:
Signature of company official on original document shall be construed as acknowledgement of receipt of any and all addenda pertaining to this specific proposal. Identification by number of addenda and date issued should be noted on all proposals submitted. FAILURE TO ACKNOWLEDGE RECEIPT OF ADDENDA ON PROPOSAL SUBMITTED MAY RESULT IN DISQUALIFICATION OF PROPOSAL.

SAMPLES:
Bidder may be required to furnish samples upon request and without charge to the College.

BID SECURITY:
A certified check or bank draft or bid bond, made payable to McHenry County College, shall be submitted with the bid in the amount of ten (10) percent of your total bid. The bid security will be forfeited by the successful bidder in the event of the bidders failure to enter into a contract. Checks or drafts of unsuccessful bidders will be returned as soon as practicable after opening and checking the bids.

INSURANCE:
The successful bidder will be required to furnish a certificate of insurance in accordance with the General Conditions.

PERFORMANCE BONDS:
The successful bidder on this proposal must furnish a performance bond and a labor and material payment bond made out to McHenry County College, prepared on an approved form, as security for the
faithful performance of their contract, within ten (10) days of their notification that their bid has been accepted. The surety thereon must be such surety company or companies as are authorized and licensed to transact business in the State of Illinois and have an minimum A-VI best rating. Attorneys in fact who sign bid bonds must file with each bond a certified copy of their power of attorney to sign said bonds. The performance and payment bonds shall be issued in an amount equal to one hundred percent (100%) of the contract sum. Such bonds shall be in force from the date of signing of the contract until one year after issuing of final certificate of payment. The cost of the bonds shall be included in the bidder’s proposal.

LAWS AND ORDINANCES:
In execution of the work, the Contractor shall comply with applicable state and local laws, ordinances and regulation, the rules and regulations of the Board of Fire Underwriters, and OSHA standards.

DAMAGE AND NEGLIGENCE:
The Contractor agrees to indemnify and save harmless the College and employees from and against all loss, including costs and attorney’s fees, by reasons or liability imposed by law upon the College for damages because of bodily injury, including death at any time resulting there from, sustained by any person or persons or on account of damage to property including loss of use thereof as provided in the General Conditions and Supplementary Conditions. College shall not be responsible for damages, delays, or failure to perform on its part resulting from acts or occurrences of force majeure. “Force majeure” means any (a) act of God, landslide, lightning, earthquake, hurricane, tornado, blizzard, floods and other adverse and inclement weather conditions; (b) fire, explosion, flood, acts of a public enemy, war, blockade, insurrection, riot or civil disturbance; (c) labor dispute, strike, work slow down, picketing, primary boycotts, secondary boycotts or boycotts of any kind and nature, or work stoppages; (d) any law, order, regulation ordinance, or requirement of any government or legal body or any representative of any such government or legal body; (e) inability to secure necessary materials, equipment, parts or other components of the project as a result of transportation difficulties, fuel or energy shortages, or acts or omission of any common carriers; or (f) any other similar cause or similar event beyond the reasonable control of College.

INVESTIGATION OF BIDDERS:
The College will make any necessary investigation to determine the ability of the bidder to fulfill the proposal requirements. McHenry County College reserves the right to reject any proposal if it is determined that the bidder is not properly qualified to carry out the obligation of the contract.

CONTRACTOR REQUIREMENTS:
The General Contractor shall employ a full-time superintendent to manage the day-to-day activities of the project. The superintendent shall be on-site at all times when subcontractors are working on-site. The superintendent shall be responsible to coordinate and manage all subcontractor work and shall have the authority to make decisions on behalf of the General Contractor.

General Contractors submitting a bid shall provide an ‘AIA A305 - Contractor’s Qualification Statement Form’ upon request of the College immediately after the bid opening. References for a minimum of five (5) projects of similar scope and value completed within the past five (5) years. References shall include project name, owner contact information, architect’s contact information, project scope, contract value, and date of completion.

General Contractors must state on the Bid Form all subcontractors intended to be used for this project. FAILURE TO DO SO MAY BE CAUSE FOR REJECTION OF BID.

PREVAILING WAGE RATE:
The successful bidder must pay not less than the prevailing hourly wage rate determined by the Illinois Department of Labor for the county where the contract is executed and the craft or type of worker needed to execute the contract. See the prevailing wage scale attached. If, during the course of work under this contract, the Department of Labor revises the prevailing rate hourly wages to be paid under this contract for any trade or occupation, Owner will notify Contractor and each Subcontractor of the changes in the prevailing rate of hourly wages. Contractor shall have the sole responsibility and duty to ensure that the revised prevailing rate of hourly wages is paid by contractor and all Subcontractors to each worker to
whom a revised rate is applicable. Revisions to the prevailing wage as set forth above shall not result in an increase in the Contract Sum.

ILLINOIS STEEL PRODUCTS PROCUREMENT ACT:
To the extent permitted by law, the project will be subject to all provisions of the "Steel Products Procurement Act" (30 ILCS 565 et. seq.) as it may be amended from time to time.

OTHER:
Sex Offender Registration Requirement Notification: Illinois Compiled Statutes (730 ILCS 150 3) requires that any person who is required by law to register as a sex offender and who is either a student or an employee at an institution of higher education, must also register with the Office of Public Safety of the institution they are employed by or attending. For purposes of this act, a student or employee is defined as anyone working at or attending the institution for a period of five (5) days or an aggregate period of more than thirty (30) days during a calendar year. THIS INCLUDES PERSONS OPERATING AS OR EMPLOYED BY AN OUTSIDE CONTRACTOR AT THE INSTITUTION. Anyone meeting the above requirements is required to register within five (5) days of enrolling or becoming employed. Persons failing to register are subject to criminal prosecution.

Substance Abuse Prevention: The successful bidder must comply with the Substance Abuse Prevention on Public Works Act (Public Act 95-0635.) The Act requires that every party to a public contract and every eligible bidder have a written substance abuse prevention program in place. By signing the bid form, the bidder certifies compliance to the conditions of this Act.

Human Rights Act: The College complies with the Human Rights Act (Public Act 88-1257.) The Act requires that every party to a public contract and every eligible bidder have written sexual harassment policies as described in this Act. By signing the bid form, the bidder certifies compliance to the conditions of this Act.

Concealed Carry Act: The College has established rules and regulations in accordance with the "Illinois Firearm Concealed Carry Act." See section 00 21 00 for detailed information.

BID QUANTITIES:
The College Board will reserve the right to increase or decrease, within reasonable limits, such quantities as need requires and at the unit price stated.

BID AWARDS:
The successful contractor, and/or any contractor shall not proceed on this bid until it receives a Notice to Proceed from the college. Failure to comply is the risk of that contractor.

END OF SECTION 00 21 13
SECTION 00 41 13 - BID FORM

To: McHenry County College
8900 US Hwy 14
Crystal Lake, IL 60012

Project: University Center at MCC

Date: ____________________________________________________________

Submitted by: ___________________________________________________

_______________________________________________________________

_______________________________________________________________

_______________________________________________________________

(Full name and address)

PART 1 - OFFER

Having examined the site and having familiarized itself with the conditions affecting the cost of the work associated with the project and with the bidding documents, Bidder hereby proposes to perform everything required and to furnish all labor, materials, necessary tools, expendable equipment, and transportation services necessary to complete in a workmanlike manner the subdivision of work stated above in accordance with the bidding documents for the following sums:

Base Bid:

We have included, attached herewith, the Bid Bond as required by the Instructions to Bidders.

The Bidder agrees to perform the work for the lump sum amount of:

TOTAL BASE BID $__________________________________________________ (in figures)

__________________________________________________ (in words)

Allowances:

The undersigned hereby states that all allowance amounts, as described in Section 01 21 00, are included in the Total Base Bid proposal amount listed above.

ALLOWANCE NO. 1: Include an allowance of $20,000.00 for unforeseen conditions.

Alternate Bids:

The undersigned hereby states the net amount of decrease or increase to the Lump Sum Base Bid for the following Alternates as described in Section 01 23 00.

ALTERNATE No. 1: Deduct from the Lump Sum Base Bid to eliminate the Liquidated Damages Clause from the contract.

Total, Alternate No. 1: $______________________________________________
ALTERNATE No. 2: Add to the Lump Sum Base Bid to provide Trane BAC Controls in lieu of individual thermostat control for the air handling units. Refer to Mechanical Drawings / Specs for additional scope details.

Total, Alternate No. 2: $__________________________________________________________

ALTERNATE No. 3: Add / Deduct to the Lump Sum Base Bid to provide electrical switchboard equipment from additional vendors. Refer to specification 26 24 13 Switchboards for additional information.

Total, Alternate No. 3: $__________________________________________________________

PART 3 - ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for thirty (90) days from the Bid closing date.

If the bid is accepted by the Owner within the time period stated above, we will:

A. Execute the Agreement within ten (10) days of receipt of Notice of Award.

B. Furnish the required bonds within ten (10) days of receipt of Notice of Award in the form described in the Supplementary Conditions.

C. Furnish the required Certificate of Insurance within ten (10) days of receipt of Notice of Award in the form and amounts described in the Supplementary Conditions.

D. Commence work as established by the written Notice to Proceed.

If this Bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bonds(s), the Security Deposit shall be forfeited as damages to the Owner by reason of our failures.

In the event our Bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

PART 4 - CONTRACT TIME

If the Bid is accepted, we will:

A. Complete the work in manner consistent to meet the requirements of the schedule.

B. Contractor has examined the Schedule included in these documents and takes no exception, or records the following exceptions:

_______________________________________________________________________________
_______________________________________________________________________________
PART 5 - CONTRACTOR’S FEES FOR CHANGES IN THE WORK

Lump Sum or Time and Materials Changes: We, the undersigned bidder, agree that the following percentages for overhead and profit shall be added to costs for the net amount of work added to, or deleted from, the contract by written lump sum or time and material change orders recommended by the Architect and approved by the Owner:

A. On Contractor’s direct net cost: 15%, with a minimum fee of one hundred dollars ($100.00).
B. On first-tier Subcontractor’s net cost: 5%, with a minimum fee of fifty dollars ($50.00). Net cost includes all sub-subcontractors work, and excludes subcontractors (all tiers) overhead and profit amounts.

Note: Insurance, bond, and taxes are considered as job cost items and are included in the percentages listed above.

PART 6 - ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted therein have been considered and all costs thereto are included in the Bid Sum.

Addendum #   Dated   Addendum #   Dated
Addendum #   Dated   Addendum #   Dated

PART 7 - SUBCONTRACTORS

Identify below which work will be completed by the General Contractor’s own forces and which work will be completed by first tier Subcontractors. Include Subcontractors name and estimated contract amount.

<table>
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<th>Scope of Work</th>
<th>GC/Sub.</th>
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<th>Est. Contract Amount</th>
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PART 8 - BID FORM SIGNATURE(S)

The Corporate Seal of:

_______________________________________________________________________________
(Bidder – please print the full name of your Proprietorship or Corporation)

Was hereunto affixed in the presence of:

___________________________________  ______________________________________
(Authorized signing officer)  (Title)

(Seal)

END OF SECTION 00 41 13
SECTION 00 43 13 – BID BOND

1.1 BID BOND INFORMATION

A. KNOW ALL MEN BY THESE PRESENTS, THAT WE ______________________________________ as Principal, hereinafter called the Principal, and ______________________________________ corporation duly organized under the laws of the State of Illinois as Surety, are held and firmly bound unto ______________________________________ as Obligee, hereinafter called Obligee, in the sum of ______________________________________ Dollars ($______________) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

B. WHEREAS, the Principal has submitted a bid for:

C. NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

D. Signed and sealed this ____ day of __________________________, 2023.

E. (Principal) _______________________________ (Seal)

F. (Witness) _______________________________ (Title)

G. (Surety) _______________________________ (Seal)

END OF SECTION 00 43 13
SECTION 00 43 15 - CONTRACTOR CERTIFICATION - ATTACHMENT B

Illinois Revised Stature 1987
Chapter 38, Sections 33E-3 and 33E-4

The undersigned hereby certifies that it is not barred from bidding on this contract as a result of violation of either Section 33E-3 (bid rigging) or 33E-4 (bid rotating) of the Illinois Revised Statutes 1987, Chapter 38.

Under penalty of perjury, the undersigned Contractor certifies that this bid has not been arrived at collusively or otherwise in violation of Federal or Illinois antitrust laws.

Company Name
________________________________________

By * __________________________________________________________________________

Address __________________________________________________________________________

City/State/ZIP _______________________________________________________________________

* Must be actual signature in ink of a representative of Contractor authorized to legally commit the Contractor.

Section 33E-5(b) pertains to disclosure of information related to the terms of a bid and any bidder's responsiveness to a request for bids. Specifically, district officials or employees must not knowingly open a sealed bid at a time or place other than as specified by the district. Also, any official who knowingly discloses any information related to the terms of a sealed bid or any bidder's responsiveness to the request for bids commits a class 3 felony. This section does allow, however, that no violation occurs if any disclosure made to an interested person also is made generally available to the public. CONSEQUENTLY, COLLEGES SHOULD BE CAUTIOUS NOT TO DISCLOSE ANY INFORMATION THAT IS NOT RELEASED TO THE PUBLIC.

Section 33E-6 contains several provisions potentially impacting College purchasing procedures. SPECIFICALLY, A PERSON COMMITS A CLASS 4 FELONY WHEN INFORMATION CONCERNING THE SPECIFICATIONS OF A CONTRACT IS KNOWINGLY CONVEYED TO A BIDDER OR PROSPECTIVE BIDDER OTHER THAN THROUGH THE BID INVITATION, PRE-BID CONFERENCE, OR CONTRACT SOLICITATION PROCEDURE. Thus, once a IFB for a particular contract is released, MCC cannot respond to individual inquiries from bidders. Likewise, no information may be volunteered concerning potential Subcontractors if the contract involves subcontracting work.

END SECTION 00 43 15
1.1 SUBSTITUTION INFORMATION

A. All bids shall be based upon the provisions of the proposed Contract Documents.

B. Bidders desiring to make substitutions for "proprietary brands" specified shall list such proposed substitutions below, together with the amount to be added or deducted from the amounts of their base bids.

C. The Owner reserves the right to reject all such substitutions, and such substitutions will not be used to determine the low bid.

D. Complete descriptions and technical data shall accompany all proposed substitutions.

E. Manufacturer's names and material approved by the Architect during the bidding time, but not shown in Addenda, must be listed below if said material is to be considered.

F. PRODUCT SPECIFIED & PROPOSED

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

G. Name of Bidder: _________________________________________________________

H. Date:  _________________________________________________________________

END OF SECTION 00 43 25
Form W-9
Request for Taxpayer Identification Number and Certification

Form (Rev. January 2011)
Department of the Treasury
Internal Revenue Service

MCHENRY COUNTY COLLEGE
University Center at MCC
DKA Project No.: 22-050

SECTION 00 43 29 - ATTACHMENT G – W9 FORM (new vendors only)

Give Form to the requester. Do not send to the IRS.

Name (as shown on your income tax return)

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification (required):  □ individual/sole proprietor  □ C Corporation  □ S Corporation  □ Partnership  □ Trust/estate

Exempt pays

Other (see instructions)

Address (number, street, and apt. or suite no.)

City, state, and ZIP code

Last account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)
Enter your TIN in the appropriate box. The TIN provided must match the name given on the “Name” line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I Instructions on page 2. If you do not have a number, see lower to get a TIN on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

Employer identification number

Part II Certification
Under penalties of perjury, I certify that:
1. The number shown on this form is my correct taxpayer identification number (or is waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out Item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, Item 2 does not apply. If mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Signature of U.S. person

Date

General Instructions
Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form
A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:
1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued), and
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is subject to the withholding tax on foreign partners’ share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester’s form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:
• An individual who is a U.S. citizen or U.S. resident alien,
• A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States.
• An estate (other than a foreign estate), or
• A domestic trust (as defined in Regulations section 1.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners’ share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

Cat. No. 10231X

Form W-9 (Rev. 1-2011)
The Business Enterprise Program for Minorities, Females, and Persons with Disabilities Act (BEP) establishes certain goals for community colleges contracting with businesses that are owned and controlled by persons who are minorities (MBE), women (WBE), or persons with disabilities (DBE) (collectively, BEP certified vendor(s)).

**Contract Goal to be Achieved by Vendor:** This solicitation includes a specific BEP participation goal of 20% of the total dollar amount of the contract.

**The BEP participation goal is applicable to all bids or offers.** McHenry County College (College) will award this contract to a Vendor that meets the goal or makes good faith efforts to meet the goal. This goal is also applicable to change orders and allowances within the scope of work provided by the BEP certified vendor. If Vendor is a BEP certified vendor, the entire goal is met and no subcontracting with a BEP certified vendor is required; however, Vendor must submit a Utilization Plan indicating that the goal will be met by self-performance. Failure to complete a Utilization Plan or provide good faith effort documentation shall render the bid or offer non-responsive or not responsible and subject to rejection and/or disqualification in the College’s sole discretion.

The following are guidelines for Vendor’s completion of the Utilization Plan. Please read the guidelines carefully. A format for the Utilization Plan is included in this section. Vendor should include any additional information that will add clarity to Vendor’s proposed utilization of certified BEP vendors to meet the targeted goal. The Utilization Plan must demonstrate that Vendor has either: (1) met the entire contract goal or (2) made good faith efforts towards meeting the goal. Any submission of good faith efforts by Vendor shall be considered as a request for a full or partial waiver.

To meet the College’s BEP participation goals, Vendor, or Vendor’s proposed Subcontractor(s), must be certified with the Business Enterprise Council as a BEP certified vendor. If Vendor or Vendor’s proposed Subcontractor(s) are not BEP certified vendors but do meet the definition of MBE, WBE, or DBE companies as set forth in 30 ILCS 575/2, Vendor shall have the burden of submitting sufficient evidence of the company’s ownership. The College shall have the sole discretion of whether to accept non-BEP certified vendors and applying said contracts towards its BEP participation goals.

1. If applicable where there is more than one prime vendor, the Utilization Plan should include an executed Joint Venture Agreement specifying the terms and conditions of the relationship between the parties and their relationship and responsibilities to the contract. The Joint Venture Agreement must clearly evidence that the BEP certified vendor will be responsible for a clearly defined portion of the work and that its responsibilities, risks, profits and contributions of capital, and personnel are proportionate to its ownership percentage. It must include specific details related to the parties’ contributions of capital, personnel, and equipment and share of the costs of insurance and other items; the scopes to be performed by the BEP certified vendor under its supervision; and the commitment of management, supervisory personnel, and operative personnel employed by the BEP certified vendor to be dedicated to the performance of the contract. Established Joint Venture Agreements will only be credited toward BEP goal achievements for specific work performed by the BEP certified vendor. Each party to the Joint Venture Agreement must execute the bid or offer prior to submission of the bid or offer to the College. The contract will not be awarded to Vendor unless the College approves the Vendor's Utilization Plan and Joint Venture Agreement, if applicable.

2. **Calculating BEP Certified Vendor Participation:** The Utilization Plan documents work anticipated to be performed, or goods/equipment provided, by all BEP certified vendors and paid for upon satisfactory completion/delivery. Only the value of payments made for the work actually performed by
BEP certified vendors is counted toward the contract goal. Applicable guidelines for counting payments attributable to contract goals are summarized below:

2.1. The value of the work actually performed or goods/equipment provided by the BEP certified vendor shall be counted towards the goal. The entire amount of that portion of the contract that is performed by the BEP certified vendor, including supplies purchased or equipment leased by the BEP certified vendor shall be counted, except supplies purchased and equipment rented from the Prime Vendor submitting this bid or offer.

2.2. A vendor shall count the portion of the total dollar value of the BEP contract equal to the distinct, clearly defined portion of the work of the contract that the BEP certified vendor performs toward the goal. A vendor shall also count the dollar value of work subcontracted to other BEP certified vendors. Work performed by the non-BEP certified party shall not be counted toward the goal. **Work that a BEP certified vendor subcontracts to a non-BEP certified vendor will not count towards the goal.**

2.3. A Vendor shall count toward the goal 100% of its expenditures for materials and supplies required under the contract and obtained from BEP certified vendor manufacturers, regular dealers, or suppliers. A Vendor shall count toward the goal the following expenditures to BEP certified vendors that are not manufacturers, regular dealers, or suppliers:

2.3.1. The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, provided that the fee or commission is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services.

2.3.2. The fees charged for delivery of materials and supplies required by the contract (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer or a supplier of the materials and supplies being procured, provided that the fee is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services. The BEP certified vendor’s trucking firm must be responsible for the management and supervision of the entire trucking operation for which it is responsible on the contract, and must itself own and operate at least one fully licensed, insured and operational truck used on the contract.

2.3.3. The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract, provided that the fee or commission is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services.

2.4. BEP certified vendors who are performing the contract as second tier subcontractors may be counted in meeting the established BEP goal for this contract as long as the Prime Vendor can provide documentation indicating the utilization of these vendors.

2.5. A Vendor shall count towards the goal only expenditures to firms that perform a commercially useful function in the work of the contract. A Vendor shall not count towards the goal expenditures that are not direct, necessary and related to the work of the contract. Only the amount of services or goods that are directly attributable to the performance of the contract shall be counted. Ineligible expenditures include general office overhead or other Vendor support activities.
3. **Good Faith Effort Procedures**: Enclosed and sealed with the Vendor’s bid documents, the Vendor must submit a: (1) Utilization Plan and (2) either Letters of Intent or subcontract documents that meet or exceed the published goal. If Vendor cannot meet the stated goal, Vendor must submit documents to support the good faith efforts it undertook to meet the goal. The College has the right to reject Vendor’s bid as not-responsible and/or not responsive if the College or the Business Enterprise Council determine, in either of their sole discretion, that Vendor failed to make a good faith effort to meet the MBE goals. The College may also accept and enter into a contract with a Vendor that can provide sufficient evidence of MBE, WBE or DBE status of Vendor or its proposed subcontractors and/or sub-vendors in compliance with the Illinois Business Enterprise for Minorities, Females, and Persons with Disabilities Act. If the College or the Council determine that Vendor has made good faith efforts to meet the goal, the College may award the contract provided that Vendor is otherwise eligible for award.

4. **Contract Compliance**: Compliance with this section is an essential part of the contract. The following administrative procedures and remedies govern Vendor’s compliance with the contractual obligations established by the Utilization Plan. **After approval of the Utilization Plan and award of the contract, the Utilization Plan becomes part of the contract.**

4.1. The Utilization Plan may not be amended after contract execution without the College’s prior written approval. Vendor may not make changes to its contractual BEP certified vendor commitments or substitute BEP certified vendors without the College’s prior written approval. The Vendor’s request to substitute BEP certified vendors must state the specific reasons for the change or substitutions. Unauthorized changes or substitutions, including performing the work designated for a BEP certified vendor with Vendor’s own forces, shall be a violation of the Utilization Plan and a breach of the contract, and shall be cause to terminate the contract, and/or seek other contract remedies or sanctions.

4.2. Vendor shall maintain a record of all relevant data with respect to the utilization of BEP certified vendors, including but without limitation, payroll records, invoices, canceled checks and books of account for a period of at least three years after the completion of the contract. The College shall have the right to access to these records upon 48 hours written demand. The College shall have the right to obtain from Vendor any additional data reasonably related or necessary to verify any representations by Vendor.

4.3. The College reserves the right to withhold payment to Vendor to enforce these provisions and Vendor’s contractual commitments. Final payment shall not be made pursuant to the contract until Vendor submits sufficient documentation demonstrating compliance with its Utilization Plan.
UTILIZATION PLAN

The Utilization Plan and Letter of Intent must be sealed and submitted with Vendor’s Bid Documents. (Vendor) submits the following Utilization Plan as part of our bid or offer in accordance with the requirements of the BEP Program Status and Participation section of the solicitation for McHenry County College’s Greenhouse Project.

Vendor submits the following statement:

☐ Vendor is a BEP certified firm and plans to fully meet the goal through self-performance.

☐ Vendor has identified BEP certified subcontractor(s) to fully meet the established goal and submits the attached executed Letter(s) of Intent; or

☐ Vendor has made good faith efforts towards meeting the entire goal, or a portion of the goal, and hereby requests a waiver (complete checklist below).

Vendor’s designee responsible for compliance with this BEP goal:

Name: 
Title: 
Telephone: 
Email:
**BEP Utilization Plan**

The following firms will be utilized to meet the goals of the BEP Program:

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<th>Contract Value</th>
<th>Description of Work</th>
<th>% of Goal</th>
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DEMONSTRATION OF GOOD FAITH EFFORTS TO ACHIEVE GOAL AND REQUEST FOR WAIVER

If the BEP participation goal was not achieved, Vendors must provide documented evidence of good faith efforts to achieve the goal.

Below is a checklist of actions that will be used to evaluate a Vendor’s Demonstration of Good Faith Efforts and Request for Waiver. Please check the actions which you completed. If any of the following actions are not completed, please attach a detailed written explanation indicating why such action was not completed. If any other efforts were made to obtain BEP participation in addition to the items listed below, attach a detailed description of such efforts. The College reserves the right to review and audit the results of the Vendor’s good faith efforts.

☐ Utilize the Sell2Illinois website: [www2.illinois.gov/cms/business](http://www2.illinois.gov/cms/business) to identify BEP certified vendors within the respective commodity/service codes denoted above and at a minimum email all listed vendors and solicit quotes from all vendors who express an interest via follow-up emails or telephone calls.

☐ Solicit through all reasonable and available means (e.g., attendance at a vendor conference, advertising and/or written notices) the interest of BEP certified vendors that have the capability to perform the work of the contract. Vendor must solicit this interest within sufficient time to allow the BEP certified vendors to respond to the solicitation. Vendor must determine with certainty if the BEP certified vendors are interested by taking appropriate steps to follow up initial solicitations and encourage them to submit a bid or proposal. Vendor must provide interested BEP certified vendors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding promptly to the solicitation.

☐ Select portions of the work to be performed by BEP certified vendors in order to increase the likelihood that the goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate BEP certified vendor participation, even when Vendor might otherwise prefer to perform these work items with its own forces.

☐ Make a portion of the work available to BEP certified vendors and selecting those portions of the work or material needs consistent with their availability, so as to facilitate BEP certified vendor participation.

☐ Negotiate in good faith with interested BEP certified vendors. Evidence of such negotiation must include the names, addresses, email addresses, and telephone numbers of BEP certified vendors that were considered and an explanation as to why an agreement could not be reached.

☐ Thoroughly investigate the capabilities of BEP certified vendors and not reject them as unqualified without documented reasons.

☐ Make efforts to assist interested BEP certified vendors in obtaining lines of credit or insurance as required by the College.

☐ Make efforts to assist interested BEP certified vendors in obtaining necessary equipment, supplies, materials, or related assistance or services.
**GOOD FAITH EFFORTS CONTACT LOG**

Use this Log to document all contacts and responses (telephone, e-mail, fax, etc.) regarding the solicitation of BEP certified vendors within the specific scope of work selected. It is not necessary to show contacts with BEP certified vendors who are identified on the Letter(s) of Intent. Keep and submit copies of all emails sent and received from prospective BEP vendors. Include a copy of the commodity list or scope of work you solicited prospective BEP vendors to perform. Duplicate this log as necessary; do not limit your contacts to the number of spaces shown.

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<tr>
<th>Name of Certified BEP Vendor</th>
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<th>Scope of Work Solicited</th>
<th>Reason Agreement Was Not Reached</th>
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END SECTION 00 43 39
Every eligible bidder and contractor/vendor shall comply with the employment section of Public Contracts provision of the Prevailing Wage Act, 820 ILCS 130/1, as amended.

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**INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS**

**Certificate of Compliance with the Illinois Prevailing Wage Law**

This letter is to certify that_______________________________________________________________

(name of company)

is in compliance with Section 39A9 of Chapter 48 of the Illinois Revised Statutes and all amendments pertaining to the payment of prevailing wages as established by the department of labor, to all laborers, workers, and mechanics performing work under this agreement/contract.

Company street address______________________________________________________________

City______________________________________________________________________________

County____________________________________ State_______ Zip________________________

Contact name________________________________________________ contact phone____________

Sworn and subscribed to me on this ________day of ________________, 20____; before me, notary public appointed in________________________County for the state of Illinois.

__________________________________________

Signature of Notary printed name

______________________________  ________________________ ______________________________

Seal

Commission expiration date ____________ city of residence_________________________ county of residence

END SECTION 00 43 43
General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
University Center at MCC

THE OWNER:
(Name, legal status and address)
The Board of Trustees of McHenry County College
8900 US Highway 14
Crystal Lake, Illinois 60012

THE ARCHITECT:
(Name, legal status and address)
Demonica Kemper Architects
125 N. Halsted Street, Suite 301
Chicago, IL 60661

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15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.
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(1886278244)
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User Notes:
ARTICLE 1 GENERAL PROVISIONS
§ 1.1 BASIC DEFINITIONS
§ 1.1.1 THE CONTRACT DOCUMENTS
The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents included in the Project Manual, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, or (2) a Change Order.

§ 1.1.2 THE CONTRACT
The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect’s consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect’s duties.

§ 1.1.3 THE WORK
The term "Work" means all of the Contractor’s duties under the Contract Documents, including the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT
The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS
The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS
The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE
Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect’s consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER
The Initial Decision Maker, if any, is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.
§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 If any two or more provisions of the Contract Documents conflict, and such conflict relates to the quantity or quality of the Work, the Contractor agrees to provide the greater quantity and/or better quality of such Work.

§ 1.3 CAPITALIZATION
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION
In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE
§ 1.5.1 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner.

(Article paragraphs deleted)

ARTICLE 2 OWNER
§ 2.1 GENERAL
§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall, to the extent allowed by law and by the Owner's Board Policies, have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

(Article paragraphs deleted)

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. The Contractor shall provide information or other assistance as the Architect or Owner may request in connection with these obligations.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.
§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER’S RIGHT TO STOP THE WORK
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. The Owner’s rights and remedies under this section are in addition to, and not a limitation of, any other rights and remedies of the Owner under the Contract Documents or otherwise.

§ 2.4 OWNER’S RIGHT TO CARRY OUT THE WORK
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or approved construction schedules, and fails within a five-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner’s expenses and reasonable attorneys’ fees, and compensation for the Architect’s additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner within thirty (30) days after a request by the Owner.

§ 2.5 OWNER’S RIGHT TO AUDIT. The Contractor shall keep full and accurate records of all labor and material costs incurred and items billed in connection with the performance of the Work, which records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three years after Final Payment. In addition, the Contractor shall make it a condition of all Subcontracts relating to the Work that all Subcontractors will keep accurate records of costs incurred and items billed in connection with their work and that such records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three years after Subcontractor’s final completion.

ARTICLE 3 CONTRACTOR
§ 3.1 GENERAL
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor’s authorized representative. The Contractor is an independent contractor, and shall not be deemed an agent of the Owner for any reason.

§ 3.1.2 The Contractor shall perform the Work in strict accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in strict accordance with the Contract Documents either by activities or duties of the Architect in the Contractor’s administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR
§ 3.2.1 The Contractor represents that it has visited the Project site, become generally familiar with local conditions under which the Work is to be performed, correlated personal observations with requirements of the Contract Documents, and has satisfied itself as to the nature and location of the Work, the general and local conditions, including those bearing upon access (including partial or total restrictions on access), transportation, delivery, disposal, staging, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions of the ground, the character, quality and quantity of existing conditions to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under this Agreement. Any failure by the Contractor to acquaint itself with all the available information concerning these conditions will not relieve the Contractor from any obligation under the Contract Documents.
§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering latent errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any apparent errors, inconsistencies or omissions as a request for information in such form as the Architect may require. It is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor’s notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 In all cases where Work interconnects with existing facilities, Contractor shall field measure and verify at the site all dimensions relating to such existing facilities. Any conflicts in the Work and the existing facilities which could have been mitigated by the Contractor’s obligation to verify the dimensions of the existing facilities shall be promptly rectified by the Contractor at its own expense.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor’s employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall coordinate inspections by governmental authorities having jurisdiction over the Work.

§ 3.3.5 No inspection performed or failed to be performed by the Owner or Architect shall be a waiver of any of the Contractor’s obligations hereunder.
§ 3.4 LABOR AND MATERIALS
§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 The Contractor shall not at any time permit on the Project site any alcohol or controlled substances whether inside or outside of buildings or structures. Possession or use of any of the foregoing at or adjacent to the site shall obligate the Contractor to remove such offending personnel from the site and replace them at no additional cost to the Owner.

§ 3.4.5 The Contractor and any Subcontractors shall conform to labor laws of the State and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable thereto. Contractor shall enforce among all personnel directly or indirectly employed by it, and among all Subcontractors and their employees, all rules which the Owner may establish for conduct of such personnel on the site.

§ 3.4.6 The Contractor shall pay prevailing wages in accordance with and shall fully comply with all requirements of the Prevailing Wage Act, 820 ILCS 130/0.01, et seq.

§ 3.5 WARRANTY
The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work shall strictly conform to the requirements of the Contract Documents and shall be free from defects. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor’s warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES
The Owner is tax-exempt. Notwithstanding, the Contractor shall pay any applicable sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS
§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or
(2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect’s determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall immediately notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

  1. allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

  2. Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

  3. whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work on site. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent shall be subject to approval by the Owner and shall not be replaced without the prior written consent of the Owner. The Owner shall have the right to require that the Contractor replace the superintendent, at no additional cost to the Owner, at any time during the duration of the Work if his/her performance is not satisfactory to the Owner.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Owner requires additional time to review. Failure of the Owner to reply within the 14 day period shall constitute notice that Owner has no initial objection to the proposed superintendent, but shall not affect Owner’s right to make a subsequent rejection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner’s consent.
§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.1.1 The Contractor's construction schedules shall be in a bar chart format, and shall depict, at a minimum, activity identification and durations, critical path, float, early start, early finish, late start, and late finish.

§ 3.10.1.1.1 The float in the construction schedules will not be deemed exclusively available to the Contractor or Owner, but rather shall be available to either party as needed.

§ 3.10.1.2 No less than once per month, the Contractor shall submit an updated construction schedule. The updated construction schedule shall depict actual start and completion dates for Work commenced and, if appropriate, Work completed. Additionally, the updated construction schedules shall depict updated estimates of anticipated commencement and completion dates for all upcoming Work.

§ 3.10.1.3 Submission of the initial construction schedule and monthly schedule updates shall be absolute prerequisites of certification of the Contractor's application for payment.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect. If the Contractor fails to adhere to the approved construction schedule(s), Contractor shall immediately, at its own expense, take necessary measures to remedy such failure, including addition of personnel and/or equipment, overtime, and/or additional shifts. The Owner shall be entitled to rely on Contractor's schedules for coordination of its own activities, as well as the activities of other contractors working at the Project site or on the Project.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals (collectively the "Record Documents"). These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1 The Contractor shall make the Record Documents available for inspection by the Architect upon reasonable notice. Adequate maintenance of the Record Documents shall be a prerequisite to certification of the Contractor's applications for payment.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.
§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. The Contractor shall submit Product Data for all equipment and materials incorporated into the finished Work. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect’s approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect’s approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Architect has specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.
§ 3.13 USE OF SITE
The Contractor shall confine operations at the site to the site access plan, if any, and to the areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING
§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor’s consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP
§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor’s tools, construction equipment, machinery and surplus materials from and about the Project. Throughout the progress of the Work the Contractor shall continually remove from the Project Site and from any adjacent property, all waste, scraps, tools, equipment, storage facilities, machinery, trailers, and vehicles no longer required for prosecution of the Work, such that the Project Site remains clean, orderly, and safe.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK
The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS
The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION
§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect’s consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, but only to the extent caused by the Contractor’s or any Subcontractor’s breach of the Contract Documents, or by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.
ARTICLE 4 ARCHITECT
§ 4.1 GENERAL
§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

(Paragraphs deleted)
§ 4.2 ADMINISTRATION OF THE CONTRACT
§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION
Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect and the Owner each have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings. Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions.
or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect’s approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner’s review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect’s responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

(Paragraph deleted)

§ 4.2.12 Interpretations of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

§ 4.2.13 The Architect’s decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect’s response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. All requests for information shall be submitted to the Architect in a format acceptable to the Architect.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 If this Project is utilizing a construction manager at-risk, the construction manager at-risk shall be the "Contractor" referenced in these general conditions, and when the lowest, responsive and responsible multiple prime trade contractor(s) are identified and awarded contracts by the Owner, each such award shall constitute the automatic assignment of that trade contract by the Owner to the Contractor, and each such successful bidder shall then be known as a "Subcontractor." If this Project is utilizing a single general contractor or multiple prime trade contractors, and the Project is not utilizing a construction manager-at-risk, then there shall be no such assignment. In any case, a Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

(Paragraphs deleted)

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner and Architect.
Each Subcontractor acknowledges: (1) that the Owner is a direct intended third party beneficiary of each Subcontract between the Contractor and Subcontractor; (2) that notwithstanding any contract provision to the contrary, Subcontractor shall be bound to perform the Work in accordance with these AIA A201 general conditions, as amended; and (3) that the Subcontractor is not a third party beneficiary of the construction management contract between Contractor and Owner.

Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS
§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s rights and obligations under the subcontract.

(Paragraph deleted)

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
§ 6.1 OWNER’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS
§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner’s own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

(Paragraph deleted)

§ 6.2 MUTUAL RESPONSIBILITY
§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.
§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner’s or separate contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor’s delays, improperly timed activities or defective construction. The separate contractors shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor’s delays, improperly timed activities, damage to the Work or defective construction. For the purposes of facilitating this section only, the Contractor and separate contractors shall be deemed intended third party beneficiaries to each other’s respective contracts with the Owner.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER’S RIGHT TO CLEAN UP
If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and allocate the cost among those responsible.

ARTICLE 7  CHANGES IN THE WORK
§ 7.1 GENERAL
§ 7.1.1 The Owner may, without invalidating the Contract and without notice to the surety, direct changes in the Work. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.1.4 No Change Order shall be approved or paid unless preceded by written direction for Change is provided by the Owner. This requirement cannot be waived. There shall be no implicit or constructive change orders.

§ 7.2 CHANGE ORDERS
§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:
.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 No payment for changes in the Work shall be made until such change has been memorialized in an executed Change Order and the Change has been executed.

§ 7.2.3 The Contractor shall be permitted the following markups for additive changes orders, and shall be required to take the following mark-downs for deductive change orders. Additional markup for insurance or bonds will not be allowed. All change order requests must be submitted with the following backup information or they will not be
reviewed by the Architect or Owner: material and labor quantities, material unit costs, labor rates, and any other substantiating data to explain the change order amount.

Markups and Markdowns for Change Orders:

Additive Change Order: 10%
Deductive Change Order: 10%

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order for the purposes of defining the change and/or how payment shall be calculated, but not for the purpose of approving payment.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

1. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
2. Unit prices stated in the Contract Documents or subsequently agreed upon;
3. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
4. As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated change by more than 25% in a proposed Change Order or Construction Change Directive, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Upon execution by the Owner, such agreement shall be effective and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit (as provided in §7.2.3). In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

1. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers’ compensation insurance;
2. Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
4. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

(Paragraph deleted)

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK
The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME
§ 8.1 DEFINITIONS
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. Unless provided elsewhere in the Contract Documents, the Contractor shall achieve Final Completion within thirty (30) days following Substantial Completion.

§ 8.3 DELAYS AND EXTENSIONS OF TIME
§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 Extension of Contract Time pursuant to this Article 8 shall be the Contractor’s sole and exclusive remedy for delay.

§ 8.3.4 Extension of Contract Time resulting from Changes in the Work shall be negotiated into respective Change Orders. Whenever the Contractor seeks an adjustment in the Contract Time as part of a Claim or Change Order, the

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Contractor shall justify the request with proper written reference to the approved construction schedules. All executed Change Orders shall be deemed to include adjustments in the Contract Time, if any, resulting from the underlying Change in the Work.

§ 8.3.5 In addition to liquidated damages set forth elsewhere in the Contract Documents, if any, the Contractor shall reimburse the Owner for all Architect’s fees for additional services necessitated by (1) Contractor’s failure to achieve Substantial Completion within the time established in the Contract Documents; and (2) for more than one inspection for Substantial Completion; and (3) for more than one inspection for Final Completion.

ARTICLE 9  PAYMENTS AND COMPLETION
§ 9.1 CONTRACT SUM
The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to all of the Subcontractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES
The Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various Subcontracts in such form and supported by such data to substantiate its accuracy as the Architect may require. Each section of the schedule organized by Subcontract shall further allocate each Subcontractor’s Work into discrete tasks with values corresponding to each task. The total of all values for all tasks for all Subcontractors shall equal the Contract Sum. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. Approval by the Owner of the schedule of values (and revisions thereto) shall be a condition precedent to certification of Contractor’s applications for payment.

§ 9.3 APPLICATIONS FOR PAYMENT
§ 9.3.1 The Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor’s right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. The Contractor’s inclusion in an Application for Payment of an amount owed to a Subcontractor shall constitute the Contractor’s certification to the Owner that such Subcontractor is entitled to payment in that amount, and that there are no backcharges, Claims or other disputes then pending or anticipated which may impact that Subcontractor’s right to such payment. Contractor shall submit all Applications for Payment in a consistent format.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not approve payment to a Subcontractor or material supplier, unless such Work has been performed by others for whom the Contractor approves payment.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor’s knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.
§ 9.3.4 All Applications for Payment shall be accompanied by lien waivers from the Contractor and applicable Subcontractors. The lien waivers, when taken together, shall equal the sum due and paid under the immediately preceding Application for Payment, and shall be effective through the submittal date of the immediately preceding Application.

§ 9.3.5 All Applications for Payment shall be accompanied by the Contractor’s and Subcontractors’ certified payrolls as required by the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 9.3.6 Submission of properly executed lien waivers and the certified payrolls shall be conditions precedent to certification of the respective Application for Payment.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor’s Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect’s reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect’s evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect’s knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor’s right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect’s opinion the representations to the Owner required by Section 9.4.2 cannot be made, or if any other condition precedent to payment has not occurred. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect’s opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- defective Work not remedied;
- third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- damage to the Owner or a separate contractor;
- reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.
§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.5.4 If at any time there is evidence of any liens or claims for which, if established, the Owner may become liable for and which would be chargeable to the Contractor or any Subcontractor, the Owner shall have the right to retain, out of any payment due or thereafter to become due to Contractor or a Subcontractor, an amount sufficient to completely indemnify the Owner against such lien or claim, including any reasonable attorneys fees that have been or may be incurred by the Owner. Should any such evidence be established after all payments are made, the Contractor or Subcontractor shall repay the Owner all sums which the Owner may be compelled to pay in discharging such lien or claim, including all reasonably attorneys fees and other costs resulting from such lien or claim.

§ 9.6 PROGRESS PAYMENTS
§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor’s portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

(Paragraph deleted)

§ 9.6.8 The Owner shall withhold ten percent (10%) from the periodic Progress Payments to the Contractor as retention. Payment of retention shall be requested with the Contractor’s application for Final Payment. No interest shall accrue on monies held in retention. Contractor shall ensure that each contract between Contractor and each Subcontractor contains this same provision for the withholding and release of retention.

§ 9.7 FAILURE OF PAYMENT
If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days’ written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Subcontractor’s reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION
§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for

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its intended use. The Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of the Owner’s personnel in the operation of systems has been completed and documented, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that the Owner can occupy the Project on that date and the completion of the Work by the Contractor will not materially interfere or hamper the Owner’s normal business operations and/or use and enjoyment of the Project. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty calendar days following the Date of Substantial Completion. The Contractor shall secure and deliver to the Owner written warranties and guarantees from all Subcontractors, Sub-Subcontractors and suppliers bearing the date of Substantial Completion or some other date as may be agreed to by the Owner and stating the period of warranty as required by the Contract Documents. The Contractor is responsible for the warranty of all Work performed by Subcontractors at any tier. If in the event Contractor does not complete remaining work, within forty five (45) days of Substantial completion, Owner shall give the Contractor written notice of the remaining Work to be completed. If the Contractor fails to complete the remaining work to be completed within seven (7) days of receipt of the written notice, the Owner reserves the right to complete the remaining Work in accordance with § 2.4 without further notice to the Contractor. All costs incurred by Owner therein shall be offset against Contractor’s final payment.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment (the "Punch List"). Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor’s Punch List, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the Contractor’s Punch List, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof, as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 Upon Substantial Completion, the Contractor and Subcontractors hereby assign all vendor and manufacturers’ warranties to the Owner. All such warranties shall be submitted to the Architect prior to submission of the final Application for Payment.

§ 9.8.7 The Contractor’s submittal of the following documents shall be a condition precedent to a determination of Substantial Completion:

  a. All Record Documents
  b. All Operations and Maintenance Manuals (3 copies in 3-ring binders)
  c. All Manufacturers’ warranties
§ 9.8.8 LIQUIDATED DAMAGES. The parties agree that time is of the essence of this Agreement. If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion date(s) established in the Contract Documents and/or as established in the approved construction schedules, as may be adjusted by extensions of time contained in fully-executed Change Orders, if any (the "Scheduled Date(s) of Substantial Completion"), the Contractor shall be liable to and shall pay the Owner an amount of liquidated delay damages per calendar day for each and every such day between the Scheduled Date(s) of Substantial Completion and the actual date(s) of Substantial Completion, and the Owner may set off and deduct such amounts from payments due, or which may later become due, to the Contractor. At the Owner’s option, the amount of liquidated delay damages applicable to this Section may be established elsewhere in the Contract Documents.

The parties stipulate and agree that this provision is fair and reasonable, and the per day rate established in the Contract Documents is fair and reasonable, considering the nature of the harm that may be incurred by the Owner as a result of such delay, and the difficulty or impossibility of ascertaining, calculating, and/or proving the actual damages resulting from such delay. The parties stipulate and agree that this Section 9.8.8 is a valid and enforceable liquidated delay damages clause, and is not a penalty. The liquidated damages clause contained in the Contract Documents shall be Owner’s sole and exclusive remedy against Contractor for delay.

If the Contract Documents do not establish liquidated delay damages, or if the liquidated delay damages clause contained in this Section 9.8.8 is determined to be unenforceable in whole or in part, by any court or tribunal of competent jurisdiction, the parties agree that the mutual waiver of consequential damages in Section 15.1.6 shall be null and void.

§ 9.9 PARTIAL OCCUPANCY OR USE
§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT
§ 9.10.1 All Work depicted on the Contractor’s Punch List and thereafter identified in the Architect’s inspection shall be completed by Contractor within thirty days of issuance of the Certificate of Substantial Completion. Upon receipt of the Contractor’s written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect’s knowledge, information and belief, and on the basis of the Architect’s on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect’s final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor’s being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract...
Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted, less retention. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

(Paragraphs deleted)

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and specifically identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Neither the Owner nor the Architect shall be responsible for any safety precautions or programs in connection with the Work.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

1. employees on the Work and other persons who may be affected thereby;
2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections

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10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor’s obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor’s organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor’s superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor’s written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume. By Change Order, the Contract Time shall be extended appropriately.

(Paragraph deleted)

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner’s fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES
In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor’s discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.
ARTICLE 11 INSURANCE AND BONDS
§ 11.1 CONTRACTOR’S LIABILITY INSURANCE

§ 11.1.1 The Contractor and each Subcontractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor’s and Subcontractor’s operations and completed operations under the Contract and for which the Contractor or Subcontractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers’ compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor’s employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor’s employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability insurance applicable to the Contractor’s or Subcontractor’s obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor’s completed operations coverage, until three (3) years after the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents, whichever is greater.

§ 11.1.3 Certificates of insurance and policy endorsements as required below shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor or applicable Subcontractor with reasonable promptness.

§ 11.1.4 The Contractor and each Subcontractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the “The Board of Trustees of McHenry County College,” the Architect and the Architect’s Consultants as additional insureds for claims caused in whole or in part by the Contractor’s or Subcontractor’s negligent acts or omissions during the Contractor’s or Subcontractor’s operations; and (2) the “The Board of Trustees of McHenry County College” as an additional insured for claims caused in whole or in part by the Contractor’s or Subcontractor’s negligent acts or omissions during the Contractor’s or Subcontractor’s completed operations. The applicable policies shall be endorsed to indicate that they are primary as respects the additional insureds, and not contributory with any other insurance available to the additional insureds.

§ 11.1.5 Unless modified in writing by the Owner, Contractor and each Subcontractor shall maintain, at its own expense, the following insurance coverages on an occurrence basis insuring the Contractor or Subcontractor as applicable, its employees and agents, and the Indemnities as required in Section 3.18, which insurance shall be provided by insurance companies rated at least A / XIV by Best’s Key Rating Guide and shall incorporate a provision requiring the giving of written notice to Owner at least thirty (30) days prior to the cancellation, non-renewal, or material modification of any such policies.
§ 11.1.6.1 Contractor and the Subcontractors shall not commence Work under this Contract until all insurance required below is obtained and approved by the Owner.

§ 11.1.6.2 Commercial General Liability Insurance (including limited form contractual liability and completed operations, explosion, collapse and underground hazards), covering personal injury, bodily injury and property damage in the amount of One Million Dollars ($1,000,000) per occurrence and Two Million Dollars ($2,000,000) aggregate.

§ 11.1.6.3 Automobile Liability Insurance, including hired and non-owned vehicles, if any, in the amount of One Million Dollars ($1,000,000) covering personal injury, bodily injury and property damage.

§ 11.1.6.4 Workmen's Compensation Insurance in the amount of the statutory minimum with an Employer's Liability coverage of at least Five Hundred Thousand Dollars ($500,000).

§ 11.1.6.5 Umbrella / excess insurance coverage with a limit of at least Two Million Dollars ($2,000,000).

§ 11.1.6.6 Failure of either the Architect or Owner to demand certificates of insurance and/or policies and/or endorsements shall not constitute a waiver of the Contractor's and Subcontractor's responsibilities under this Article 11. Nor shall review and/or approval by either the Owner or Architect in any way relieve Contractor or any Subcontractor of its responsibility for furnishing sufficient insurance. The endorsements or amendatory riders shall indicate that as respects said additional insureds, there shall be severability of interests under the policies.

§ 11.1.6.7 Under no circumstance shall Contractor be relieved of providing insurance as required by this Article 11. If inspection of certificates, endorsements, or policies by Owner would reasonably reveal any deficiencies in coverage as required, Contractor shall not be relieved of its obligation to provide insurance coverages as required herein and may not assert any defense of waiver, acquiescence, estoppel, or otherwise by the failure of Owner or its agents to object to the form of the certificate, endorsements, or policies, or other documents provided by the Contractor.

§ 11.1.7 Contractor shall also protect the Owner by specifically incorporating this Article 11 into every Subcontract entered into and also requiring that every Subcontractor incorporate this Article 11 and its coverage requirements into every sub-subcontract it enters into. Notwithstanding this requirement, this Article 11 is deemed incorporated into every Subcontract and sub-subcontract via such document's flow-through provisions.

§ 11.1.8 Liability of Contractor or Subcontractor is not limited by these insurance requirements or by actual insurance coverage. Nothing contained in the insurance requirements of the Contract Documents is to be construed as limiting the liability of the Contractor, the liability of any Subcontractor of any tier, or the liability of the Architect, or any of their respective insurance carriers. Owner does not, in any way, represent that the coverages or limits of insurance specified are sufficient or adequate to protect the Owner, Contractor, Architect, or any Subcontractor's interest or liabilities, but are merely minimums. The obligation of the Contractor and every Subcontractor of any tier to purchase insurance shall not, in any way, limit their obligations to the Owner in the event that the Owner should suffer an injury or loss in excess of the amount recoverable through insurance, or any loss or portion of the loss which is not covered by either the Architect's, Contractor's or any Subcontractor's insurance.

§ 11.2 OWNER'S LIABILITY INSURANCE
The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE
§ 11.3.1 Unless otherwise provided, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Subsubcontractors in the Project.
§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Owner, Architect's and Contractor's services and expenses required as a result of such insured loss.

(Paragraph deleted)

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance if required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

(Paragraphs deleted)

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

Owner and Contractor each reserve their respective rights of subrogation.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay the Owner and/or Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

(Paragraph deleted)

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor as principal shall furnish to the Owner as obligee bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. The payment and performance bonds shall

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strictly comply with the Public Construction Bond Act, 30 ILCS 550/0.01, et seq., and with all provisions of this Article 11.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.2.1 Prior to commencing Work, Contractor shall furnish a performance bond and a payment bond to the Owner as obligee with a penal sum equal to the Contract Sum including accepted alternates, and if the Contractor is a Construction Manager at-risk who took assignment of trade contracts pursuant to Section 5.1.1, the penal sum of such bonds shall equal the sum of all Subcontractors' bids, including accepted alternates. The surety for the performance and payment bonds shall be rated not less than A / VI by Best's Insurance Guide Key.

§ 11.4.3 If at any time the Owner shall become reasonably dissatisfied with any surety, or for any other reason such bonds shall cease to be adequate security for the Owner, Contractor shall, within five (5) days after notice to do so, substitute acceptable bonds in such form and sum signed and signed by such other surety or sureties as may be reasonably satisfactory to the Owner. No further payment shall be deemed due nor shall be made to Contractor until the new surety or sureties shall have met the Owner's qualifications.

§ 11.4.4 All performance and payment bonds required by this Article 11 shall be executed in conformity with American Institute of Architects Document A311, or such other form as is acceptable to the Owner. Said bond forms shall be deemed modified to the extent to be consistent with this Article 11. A certified copy of the power of attorney from the surety company stating that the person executing the bond is duly authorized by the surety to execute the bond shall be attached to the bond.

§ 11.4.5 Whenever the Contractor shall be and is declared by the Owner to be in default under the Construction Contract, the surety shall be responsible to compensate the Owner for the following costs incurred by the Owner as they result of the default: 1) any and all extra work and/or corrective work, 2) additional Architect costs, 3) accounting costs, 4) legal costs and reasonable attorneys’ fees, 5) testing, consulting, and other engineering costs, 6) any other costs necessarily incurred and resulting from the default. Notwithstanding, the surety's obligations shall not exceed the penal sum of the bond.

§ 11.4.6 All terms and conditions of all Contract Documents, including these A201 general conditions, as amended, shall be deemed incorporated by reference into each bond furnished in connection with this Article 11. In case of any conflict between any provision of any performance or payment bond and the Contract Documents, the provisions of the Contract Documents shall prevail to the extent of such conflict.

§ 11.4.7 Any provision of any bond purporting to create a condition precedent for Owner not otherwise contained in the Contract Documents, or which otherwise purports to abrogate or nullify the Owner's rights or remedies otherwise available in contract, law, or equity, is void. If any provision of any bond purports to shorten the period of limitations and/or the period of repose as provided in Section 13-2-14 of the Code of Civil Procedure, 735 ILCS 5/13-214, or if any provision of any bond purports to short any other applicable statute of limitation or repose, such provision of such bond shall be stricken from such bond prior to execution, and if not stricken shall be deemed null and void, but all other provisions of such bond shall remain enforceable.

§ 11.4.8 In the event any surety shall make any assignment for the benefit of creditors or commit any act of bankruptcy, or is declared bankrupt, or if it shall file a voluntary petition in bankruptcy, or shall in the opinion of the Owner be insolvent, the Contractor shall immediately upon request by the Owner furnish and maintain other bonds satisfactory to the Owner.

§ 11.4.9 No surety shall assert solvency of its principal or its principal’s denial of default as a defense to any claim under any bond furnished in accordance with this Article 11.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK
§ 12.1 UNCOVERING OF WORK
§ 12.1.1 If a portion of the Work is covered contrary to the Owner’s or Architect’s request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or Architect, be

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uncovered for the Owner’s or Architect’s examination and be replaced at the Contractor’s expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner or Architect has not specifically requested to examine prior to its being covered, the Owner or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner’s expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor’s expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK
§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION
The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect’s services and expenses made necessary thereby, shall be at the Contractor’s expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION
§ 12.2.2.1 In addition to the Contractor’s obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any 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 the Contractor an express, written acceptance of such specific condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall be extended on specific items of Work identified as defective, and such extension shall commence upon the performance of corrective Work by the Contractor pursuant to this Section 12.2. Such extension shall expire one year from the date of completion of such corrective Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor’s correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to any obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the Owner may seek to enforce that obligation or any other obligation arising under the Contract Documents.

§ 12.2.6 All other warranties and guarantees required by the Contract Documents shall be provided to the Architect prior to Substantial Completion, and are separate obligations from the obligations contained in this Section 12.2.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK
If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so by express written notice to the Contractor instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.
ARTICLE 13  MISCELLANEOUS PROVISIONS
§ 13.1 GOVERNING LAW
The Contract shall be governed by the law of the State of Illinois without regard for conflict of law principles.

§ 13.1.1 Contractor and each Subcontractor shall comply with the Illinois Human Rights Act, 775 ILCS 5/2-101 et seq., and Contractor and each Subcontractor hereby certifies that he/she/it has and will maintain at all times during the term of this agreement a written sexual harassment policy in accordance with 775 ILCS 5/2-105(A)(4).

§ 13.1.2 Contractor and each Subcontractor hereby certifies pursuant to Section 33E-11 of the Illinois Criminal Code that he/she/it is not barred from bidding on, or contracting in connection with, the Project as a result of a conviction for either bid-rigging or bid rotating under Section 33E-3 or 33E-4 of the Criminal Code.

§ 13.1.3 The Contractor and each Subcontractor hereby certifies that he/she/it will provide a drug free workplace in compliance Section 3 of the Drug Free Workplace Act, 30 ILCS 580/3.

§ 13.1.4 At least once per month, the Contractor and each Subcontractor shall submit to the Owner certified payrolls in accordance with Section 5 of the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 13.1.4.1 Upon the Owner’s request, any employee of the Contractor or any employee of any Subcontractor or vendor shall submit state-issued identification documents (e.g. driver’s license, state identification card, etc.) or other documents to the Owner so that the Owner may obtain a criminal background check of the employee. No person who fails or refuses to produce such documents may work on the Project at the Project site. Alternatively, the Owner reserves the right to direct the Contractor, at any time during the Project, to immediately obtain criminal background checks of Contractor’s or Subcontractor’s employees to ascertain whether such employees have been convicted of any offenses. Such criminal background checks will be performed at Contractor’s or Subcontractor’s expense and at no additional cost to Owner. If in the Owner’s sole discretion objectionable information regarding any employee is discovered in the background check, whether performed by Owner or Contractor, such person shall not be allowed to work on the Project at the Project site. The Owner may request new background checks of any employee at any time.

§ 13.1.5 This contract is subject to and shall be construed in accordance with all provisions of law applicable to the Work and the Project. All applicable rules of law shall prevail over any conflicting provision contained in any of the Contract Documents.

§ 13.2 SUCCESSORS AND ASSIGNS
§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Contractor shall not assign the Contract in whole or in part without written consent of the Owner.

(Paragraph deleted)
§ 13.3 WRITTEN NOTICE
Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES
§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.
§ 13.5 TESTS AND INSPECTIONS
§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear, without markup, costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner’s expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect’s services and expenses shall be at the Contractor’s expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST
Payments due and unpaid under the Contract Documents shall bear interest only in accordance with the Local Government Prompt Payment Act, 50 ILCS 505/1, et seq.

(Paragraphs deleted)

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT
§ 14.1 TERMINATION BY THE CONTRACTOR
§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

1. Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
2. An act of government, such as a declaration of national emergency that requires all Work to be stopped;
3. Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents;

(Paragraphs deleted)
§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven days’ written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work properly executed in conformance with the Contract Documents as of the date of termination.

§ 14.1.4 If the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner’s obligations under the Contract
Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

(Paragraphs deleted)

§ 14.2.1 The Owner may upon notice to the Contractor terminate its contract with the Contractor or cause the Contractor to terminate any Subcontract with any Subcontractor if:

.1 the Contractor or that Subcontractor fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work;

.2 the Contractor or that Subcontractor institutes proceedings or consents to proceedings requesting relief under the Federal Bankruptcy Act or any similar federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor or that Subcontractor and such petition is not dismissed within sixty (60) days from the date of filing, or if the Contractor or that Subcontractor admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of such bankruptcy or insolvency;

.3 the Contractor or that Subcontractor abandons the Work;

.4 the Contractor or that Subcontractor submits an Application for Payment, sworn statement, waiver of lien, certified payroll, affidavit or other document of any nature whatsoever which is intentionally falsified or which the Contractor or that Subcontractor knows to contain a false statement;

.5 a mechanic's or materialman's lien or notice of lien or claim of lien is filed against any part of the Work, the public funds allocated for the Work, or on the site of the Project, if after written demand by the Owner such lien is not promptly released or satisfied; or

.6 the Contractor or that Subcontractor disregards any laws, statutes, ordinances, rules, regulations or orders of a governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project.

The termination rights under this Subparagraph 14.2.1 shall be in addition to and not in limitation of any rights or remedies, contractual, statutory or otherwise.

§ 14.2.4 In the event of termination pursuant to Section 14.2, the Contract Sum shall be reduced by Change Order to reflect any increased costs to the Owner of completing the Work, and if the unpaid balance of the Contract Sum exceeds all costs to the Owner of completing the Work, the Contractor shall pay the difference to the Owner upon written demand by the Owner. Such costs shall include but not be limited to the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another Contractor or other Subcontractors, any additional interest or fees which the Owner must pay by reason of a delay in completing the Work, reasonable attorneys' fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. The amount, if any, to be paid to the Contractor shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause and in its sole discretion, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 To the extent not due to the fault of Contractor, the Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent
that performance is, was or would have been so suspended, delayed or interrupted by another cause for
which the Contractor is responsible; or

that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE
§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner’s convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner’s convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;

and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work properly executed in conformance with the Contract Documents.

ARTICLE 15 CLAIMS AND DISPUTES
§ 15.1 CLAIMS
§ 15.1.1 DEFINITION
A Claim is a demand or assertion by the Contractor seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The responsibility to substantiate Claims shall rest with the Contractor.

§ 15.1.2 NOTICE OF CLAIMS
Claims by the Contractor must be initiated by written notice to the Owner and to the Initial Decision Maker, if any, with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST
If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor’s Claim shall include an estimate of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. For Claims for Additional Time, to the extent that an equitable extension of Time is warranted, such extension shall be the Contractor’s sole and exclusive remedy.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.5.3 For all Claims for Additional Time, the Contractor shall support such Claims in the same manner as supporting additional time for Change Orders.
§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES
The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 delay damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit.

This mutual waiver is applicable, without limitation, to all consequential delay damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims by the Contractor ("Claims"), excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to arbitration or litigation, as the case may be, of any Claim initiated by Contractor and arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker’s sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner’s expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall not be binding.

(Paragraphs deleted)
§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor’s default, the Owner may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic’s lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

(Paragraphs deleted)
§ 15.4 ARBITRATION

§ 15.4.1 In the sole and exclusive discretion of the Owner, all claims, disputes and other matters in question between any of the Architect, Owner, Contractor, Surety, Subcontractor or any material supplier arising out of, or relating to, agreements to which two or more of said parties are bound, or the Contract Documents or the breach thereof, shall, in the case of such election by the Owner, be decided by arbitration. If the Owner elects such arbitration, it shall be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect at the time that the demand is made, as modified herein. In any such arbitration, the arbitrator shall make separate findings as to liability and the amount of damages with respect to each party to the arbitration to the extent any liability or responsibility for damages exists. The Architect, surety, subcontractors and material suppliers who have an interest in the dispute shall be joined as parties to the arbitration. The arbitrator shall have authority to decide all issues between the parties. The foregoing option of the Owner to arbitrate shall be specifically enforceable by the Owner under the prevailing arbitration law. The award rendered by the arbitrator shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.1.1 If the Owner elects arbitration, in its sole discretion, notice of the demand for arbitration shall be filed in writing with the other party(ies) to the arbitration and with the American Arbitration Association. Such demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would otherwise be barred by an applicable statute of limitations or repose. Whether such limitations have been met shall be decided by the arbitrator if contested by a party.

§ 15.4.1.2 All parties shall carry on the Work and perform their duties during any arbitration proceedings, and the Owner shall continue to make payments to the extent required by the Contract Documents. However, at the request of any party, contested payments may be placed in an escrow account pending resolution of the dispute.

§ 15.4.1.3 If the Owner elects arbitration, in its sole discretion, in addition to the other rules of the American Arbitration Association applicable to any arbitration hereunder, the following shall apply:

.1 Promptly after the empaneling of the arbitrator, the arbitrator shall establish a procedure for each party to set forth in writing and to serve upon each other party a detailed statement of its contentions of fact and law, along with appropriate responses thereto;

.2 All parties to the arbitration shall be entitled to reasonable discovery procedures as provided by the Illinois Code of Civil Procedure and Illinois Supreme Court Rules, as supplemented by rules to be established by the arbitrator;

.3 The arbitration shall be commenced and conducted as expeditiously as possible consistent with affording reasonable discovery as provided herein. Similarly, the scope of discovery, and the extent of proceedings hereunder relating to discovery, shall be consistent with the parties’ intent that the arbitration be conducted as expeditiously as possible.

§ 15.4.2 In the event of any litigation or arbitration between the parties hereunder, the Contractor shall pay the Owner’s reasonable attorneys’ fees and court costs to the extent the court or tribunal determines the Owner is the prevailing party.

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(Paragraphs deleted)
Additions and Deletions Report for
AIA® Document A201™ – 2007

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Crystal Lake, Illinois 60012

Demonica Kemper Architects
125 N. Halsted Street, Suite 301
Chicago, IL 60661

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The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents included in the Project Manual, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor’s bid or proposal, or portions of Addenda relating to bidding requirements, or (2) a Change Order.

The term "Work" means all of the Contractor’s duties under the Contract Documents, including the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.8 INITIAL DECISION MAKER
The Initial Decision Maker, if any, is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.15.2.

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§ 1.2.4 If any two or more provisions of the Contract Documents conflict, and such conflict relates to the quantity or quality of the Work, the Contractor agrees to provide the greater quantity and/or better quality of such Work.
§ 1.5
OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' Owner's reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants—Owner.

§ 4.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall, to the extent allowed by law and by the Owner's Board Policies, have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.4.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. The Contractor shall provide information or other assistance as the Architect or Owner may request in connection with these obligations.
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. The Owner’s rights and remedies under this section are in addition to, and not a limitation of, any other rights and remedies of the Owner under the Contract Documents or otherwise.

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or approved construction schedules, and fails within a ten-day five-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner’s expenses and reasonable attorneys’ fees, and compensation for the Architect’s additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner within thirty (30) days after a request by the Owner.

§2.5 OWNER’S RIGHT TO AUDIT. The Contractor shall keep full and accurate records of all labor and material costs incurred and items billed in connection with the performance of the Work, which records shall be open to audit by the Owner or its authorized representatives during the performance of the Work and until three years after Final Payment. In addition, the Contractor shall make it a condition of all Subcontracts relating to the Work that all Subcontractors will keep accurate records of costs incurred and items billed in connection with their work and that such records shall be open to audit by the Owner or its authorized representatives during the performance of the Work and until three years after Subcontractor’s final completion.

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor’s authorized representative. The Contractor is an independent contractor, and shall not be deemed an agent of the Owner for any reason.

§ 3.1.2 The Contractor shall perform the Work in strict accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in strict accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the Project site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of performed, correlated personal observations with requirements of the Contract Documents, and has satisfied itself as to the nature and location of the Work, the general and local conditions, including those bearing upon access (including partial or total restrictions on access), transportation, delivery, disposal, staging, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions of the ground, the character, quality and quantity of existing conditions to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way effect the Work or
the cost thereof under this Agreement. Any failure by the Contractor to acquaint itself with all the available information concerning these conditions will not relieve the Contractor from any obligation under the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering latent errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any apparent errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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§ 3.2.5 In all cases where Work interconnects with existing facilities, Contractor shall field measure and verify at the site all dimensions relating to such existing facilities. Any conflicts in the Work and the existing facilities which could have been mitigated by the Contractor’s obligation to verify the dimensions of the existing facilities shall be promptly rectified by the Contractor at its own expense.

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

...

§ 3.3.4 The Contractor shall coordinate inspections by governmental authorities having jurisdiction over the Work.

§ 3.3.5 No inspection performed or failed to be performed by the Owner or Architect shall be a waiver of any of the Contractor’s obligations hereunder.

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§ 3.4.4 The Contractor shall not at any time permit on the Project site any alcohol or controlled substances whether inside or outside of buildings or structures. Possession or use of any of the foregoing at or adjacent to the site shall obligate the Contractor to remove such offending personnel from the site and replace them at no additional cost to the Owner.

§3.4.5 The Contractor and any Subcontractors shall conform to labor laws of the State and various acts amatory and supplementary thereto and to other laws, ordinances and legal requirements applicable thereto. Contractor shall enforce among all personnel directly or indirectly employed by it, and among all Subcontractors and their employees, all rules which the Owner may establish for conduct of such personnel on the site.

§3.4.6 The Contractor shall pay prevailing wages in accordance with and shall fully comply with all requirements of the Prevailing Wage Act, 820 ILCS 130/0.01, et seq.
The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will strictly conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. shall be free from defects. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor’s warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

The Owner is tax-exempt. Notwithstanding, the Contractor shall pay any applicable sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, received, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall immediately notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. Work on site. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent shall be subject to approval by the Owner and shall not be replaced without the prior written consent of the Owner. The Owner shall have the right to require that the Contractor replace the superintendent, at no additional cost to the Owner, at any time during the duration of the Work if his/her performance is not satisfactory to the Owner.
§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and the Architect the name and qualifications of a proposed superintendent. The Architect or Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect or Owner requires additional time to review. Failure of the Architect or Owner to reply within the 14 day period shall constitute notice of no reasonable objection that Owner has no initial objection to the proposed superintendent, but shall not affect Owner’s right to make a subsequent rejection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner’s consent which shall not unreasonably be withheld or delayed.

§ 3.10.1.1 The Contractor’s construction schedules shall be in a bar chart format, and shall depict, at a minimum, activity identification and durations, critical path, float, early start, early finish, late start, and late finish.

§ 3.10.1.1.1 The float in the construction schedules will not be deemed exclusively available to the Contractor or Owner, but rather shall be available to either party as needed.

§ 3.10.1.2 No less than once per month, the Contractor shall submit an updated construction schedule. The updated construction schedule shall depict actual start and completion dates for Work commenced and, if appropriate, Work completed. Additionally, the updated construction schedules shall depict updated estimates of anticipated commencement and completion dates for all upcoming Work.

§ 3.10.1.3 Submission of the initial construction schedule and monthly schedule updates shall be absolute prerequisite of certification of the Contractor’s application for payment.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect. If the Contractor fails to adhere to the approved construction schedule(s), Contractor shall immediately, at its own expense, take necessary measures to remedy such failure, including addition of personnel and/or equipment, overtime, and/or additional shifts. The Owner shall be entitled to rely on Contractor’s schedules for coordination of its own activities, as well as the activities of other contractors working at the Project site or on the Project.

... The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals - submittals (collectively the "Record Documents"). These shall be available to the Architect and shall be delivered to the Architect for submission to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1 The Contractor shall make the Record Documents available for inspection by the Architect upon reasonable notice. Adequate maintenance of the Record Documents shall be a prerequisite to certification of the Contractor’s applications for payment.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. The Contractor shall submit Product Data for all equipment and materials incorporated into the finished Work. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

...
§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

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The Contractor shall confine operations at the site to the site access plan, if any, and to the areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

...

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor’s tools, construction equipment, machinery and surplus materials from and about the Project. Throughout the progress of the Work the Contractor shall continually remove from the Project Site and from any adjacent property, all waste, scraps, tools, equipment, storage facilities, machinery, trailers, and vehicles no longer required for prosecution of the Work, such that the Project site remains clean, orderly, and safe.

...

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect’s consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the Contractor’s or any Subcontractor’s breach of the Contract Documents, or by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that which would otherwise exist as to a party or person described in this Section 3.18.

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§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.
§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner’s representative during construction until the date the Architect issues the final Certificate for Final Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

...

§ 4.2.6 The Architect has and the Owner each have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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§ 4.2.14 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect’s response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

...

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect’s response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. All requests for information shall be submitted to the Architect in a format acceptable to the Architect.

...

§ 5.1.1 A-If this Project is utilizing a construction manager at-risk, the construction manager at-risk shall be the "Contractor" referenced in these general conditions, and when the lowest responsive and responsible multiple prime trade contractor(s) are identified and awarded contracts by the Owner, each such award shall constitute the automatic assignment of that trade contract by the Owner to the Contractor, and each such successful bidder shall then be known as a "Subcontractor." If this Project is utilizing a single general contractor or multiple prime trade contractors, and the Project is not utilizing a construction manager-at-risk, then there shall be no such assignment. In any case, a Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

...

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK
§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.
§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsibly in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner and Architect.

Each Subcontractor acknowledges: (1) that the Owner is a direct intended third party beneficiary of each Subcontract between the Contractor and Subcontractor; (2) that notwithstanding any contract provision to the contrary, Subcontractor shall be bound to perform the Work in accordance with these AIA A201 general conditions, as amended; and (3) that the Subcontractor is not a third party beneficiary of the construction management contract between Contractor and Owner.

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.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor’s compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor’s obligations under the subcontract:

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to those including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations.
and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

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§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner and separate contractors shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction. For the purposes of facilitating this section only, the Contractor and separate contractors shall be deemed intended third party beneficiaries to each other respective contracts with the Owner.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Owner, separate contractors as provided in Section 10.2.5.

...

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

...

§ 7.1.1 The Owner may, without invalidating the Contract and without notice to the surety, direct changes in the Work. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

...

§ 7.1.4 No Change Order shall be approved or paid unless preceded by written direction for Change is provided by the Owner. This requirement cannot be waived. There shall be no implicit or constructive change orders.

...

§ 7.2.2 No payment for changes in the Work shall be made until such change has been memorialized in an executed Change Order and the Change has been executed.

§ 7.2.3 The Contractor shall be permitted the following markups for additive changes orders, and shall be required to take the following mark-downs for deductive change orders. Additional markup for insurance or bonds will not be allowed. All change order requests must be submitted with the following backup information or they will not be reviewed by the Architect or Owner; material and labor quantities, material unit costs, labor rates, and any other substantiating data to explain the change order amount.

Markups and Markdowns for Change Orders:

Additive Change Order: 10%
Deductive Change Order: 10%

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§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order. Order for the purposes of defining the change and/or how payment shall be calculated, but not for the purpose of approving payment.
§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed by more than 25% in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such an Agreement by the Owner, such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount in (as provided in §7.2.3). In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect’s professional judgment, to be reasonably justified. The Architect’s interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. Unless provided elsewhere in the Contract Documents, the Contractor shall achieve Final Completion within thirty (30) days following Substantial Completion.

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, arbitration, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect and Owner may determine.

§ 8.3.3 This section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. Extension of Contract Time pursuant to this Article 8 shall be the Contractor’s sole and exclusive remedy for delay.

§ 8.3.4 Extension of Contract Time resulting from Changes in the Work shall be negotiated into respective Change Orders. Whenever the Contractor seeks an adjustment in the Contract Time as part of a Claim or Change Order, the Contractor shall justify the request with proper written reference to the approved construction schedules. All executed
Change Orders shall be deemed to include adjustments in the Contract Time, if any, resulting from the underlying Change in the Work.

§ 8.3.5 In addition to liquidated damages set forth elsewhere in the Contract Documents, if any, the Contractor shall reimburse the Owner for all Architect's fees for additional services necessitated by (1) Contractor's failure to achieve Substantial Completion within the time established in the Contract Documents; and (2) for more than one inspection for Substantial Completion; and (3) for more than one inspection for Final Completion.

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared Subcontracts in such form and supported by such data to substantiate its accuracy as the Architect may require. Each section of the schedule organized by Subcontract shall further allocate each Subcontractor's Work into discrete tasks with values corresponding to each task. The total of all values for all tasks shall equal the Contract Sum. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Approval by the Owner of the schedule of values (and revisions thereto) shall be a condition precedent to certification of Contractor's applications for payment.

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainerage if provided for in the Contract Documents. The Contractor's certification in an Application for Payment of an amount owed to a Subcontractor shall constitute the Contractor's certification to the Owner that such Subcontractor is entitled to payment in that amount, and that there are no backcharges, claims or other disputes then pending or anticipated which may impact the Subcontractor's right to such payment. Contractor shall submit all Applications for Payment in a consistent format.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay or approve payment to a Subcontractor or material supplier, unless such Work has been performed by others for whom the Contractor intends to pay or approves payment.

§ 9.3.4 All Applications for Payment shall be accompanied by lien waivers from the Contractor and applicable Subcontractors. The lien waivers, when taken together, shall equal the sum due and paid under the immediately preceding Application for Payment, and shall be effective through the submittal date of the immediately preceding Application.

§ 9.3.5 All Applications for Payment shall be accompanied by the Contractor's and Subcontractors' certified payrolls as required by the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 9.3.6 Submission of properly executed lien waivers and the certified payrolls shall be conditions precedent to certification of the respective Application for Payment.
§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect’s opinion the representations to the Owner required by Section 9.4.2 cannot be made, or if any other condition precedent to payment has not occurred. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect’s opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

§9.5.4 If at any time there is evidence of any liens or claims for which, if established, the Owner may become liable for and which would be chargeable to the Contractor or any Subcontractor, the Owner shall have the right to retain, out of any payment due or thereafter to become due to Contractor or a Subcontractor, an amount sufficient to completely indemnify the Owner against such lien or claim, including any reasonable attorneys fees that have been or may be incurred by the Owner. Should any such evidence be established after all payments are made, the Contractor or Subcontractor shall repay the Owner all sums which the Owner may be compelled to pay in discharging such lien or claim, including all reasonably attorneys fees and other costs resulting from such lien or claim.

§9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§9.6.8 The Owner shall withhold ten percent (10%) from the periodic Progress Payments to the Contractor as retention. Payment of retention shall be requested with the Contractor’s application for Final Payment. No interest shall accrue on monies held in retention. Contractor shall ensure that each contract between Contractor and each Subcontractor contains this provision for the withholding and release of retention.

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days’ written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor’s Subcontractor’s reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of the Owner’s personnel in the operation of systems has been completed and documented, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that the Owner can occupy the Project on that date and the completion of the Work by the Contractor will not materially interfere or hamper the Owner’s normal business operations and/or use and enjoyment of the Project. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty calendar days following the Date of
Substantial Completion. The Contractor shall secure and deliver to the Owner written warranties and guarantees from all Subcontractors, Sub-Subcontractors and suppliers bearing the date of Substantial Completion or some other date as may be agreed to by the Owner and stating the period of warranty as required by the Contract Documents. The Contractor is responsible for the warranty of all Work performed by Subcontractors at any tier. If in the event Contractor does not complete remaining work within forty five (45) days of Substantial completion, Owner shall give the Contractor written notice of the remaining Work to be completed. If the Contractor fails to complete the remaining work to be completed within seven (7) days of receipt of the written notice, the Owner reserves the right to complete the remaining Work in accordance with § 2.4 without further notice to the Contractor. All costs incurred by Owner therein shall be offset against Contractor's final payment.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment (the "Punch List"). Failure to include an item on such list, the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor’s list, Punch List, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the Contractor’s list, Punch List, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof, as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 Upon Substantial Completion, the Contractor and Subcontractors hereby assign all vendor and manufacturers’ warranties to the Owner. All such warranties shall be submitted to the Architect prior to submission of the final Application for Payment.

§ 9.8.7 The Contractor’s submittal of the following documents shall be a condition precedent to a determination of Substantial Completion:

- All Record Documents
- All Operations and Maintenance Manuals (3 copies in 3-ring binders)
- All Manufacturers’ warranties

§ 9.8.8 LIQUIDATED DAMAGES. The parties agree that time is of the essence of this Agreement. If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion date(s) established in the Contract Documents and/or as established in the approved construction schedules, as may be adjusted by extensions of time contained in fully-executed Change Orders, if any (the "Scheduled Date(s) of Substantial Completion"), the Contractor shall be liable to and shall pay the Owner an amount of liquidated delay damages per calendar day for each and every such day between the Scheduled Date(s) of Substantial Completion and the actual date(s) of Substantial Completion, and the Owner may set off and deduct such amounts from payments due, or which may later become due, to the Contractor. At the Owner’s option, the amount of liquidated delay damages applicable to this Section may be established elsewhere in the Contract Documents.

The parties stipulate and agree that this provision is fair and reasonable, and the per day rate established in the Contract Documents is fair and reasonable, considering the nature of the harm that may be incurred by the Owner as a result of such delay, and the difficulty or impossibility of ascertaining, calculating, and/or proving the actual damages resulting from such delay. The parties stipulate and agree that this Section 9.8.8 is a valid and enforceable liquidated delay
damages clause, and is not a penalty. The liquidated damages clause contained in the Contract Documents shall be Owner’s sole and exclusive remedy against Contractor for delay.

If the Contract Documents do not establish liquidated delay damages, or if the liquidated delay damages clause contained in this Section 9.8.8 is determined to be unenforceable in whole or in part, by any court or tribunal of competent jurisdiction, the parties agree that the mutual waiver of consequential damages in Section 15.1.6 shall be null and void.

§ 9.10.1 All Work depicted on the Contractor’s Punch List and thereafter identified in the Architect’s inspection shall be completed by Contractor within thirty days of issuance of the Certificate of Substantial Completion. Upon receipt of the Contractor’s written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect’s knowledge, information and belief, and on the basis of the Architect’s on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect’s final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor’s being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys’ fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. Accepted, less retention. If the remaining balance for Work not fully completed or corrected is less than reainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

1. liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
2. failure of the Work to comply with the requirements of the Contract Documents; or
3. terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and specifically identified by that payee as unsettled at the time of final Application for Payment.

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The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Neither the Owner nor the Architect shall be responsible for any safety precautions or programs in connection with the Work.

§ 10.3.2 Upon receipt of the Contractor’s written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor’s reasonable additional costs of shut down, delay and start up appropriately.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect’s consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor’s fault or negligence in the use and handling of such materials or substances.

§ 11.1.1 The Contractor and each Subcontractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor’s and Subcontractor’s operations and completed operations under the Contract and for which the Contractor or Subcontractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

... .8 Claims involving contractual liability insurance applicable to the Contractor’s or Subcontractor’s obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor’s completed operations coverage, until three (3) years after the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents, whichever is greatest.

§ 11.1.3 Certificates of insurance acceptable to the Owner and policy endorsements as required below shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision...
that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor or applicable Subcontractor with reasonable promptness.

§ 11.1.4 The Contractor and each Subcontractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, "The Board of Trustees of McHenry County College," the Architect and the Architect’s consultants as additional insureds for claims caused in whole or in part by the Contractor’s or Subcontractor’s negligent acts or omissions during the Contractor’s operations; and (2) the Owner or Subcontractor’s operations; and (2) the "The Board of Trustees of McHenry County College" as an additional insured for claims caused in whole or in part by the Contractor’s or Subcontractor’s negligent acts or omissions during the Contractor’s or Subcontractor’s completed operations. The applicable policies shall be endorsed to indicate that they are primary as respects the additional insureds, and not contributory with any other insurance available to the additional insureds.

§ 11.1.5 Unless modified in writing by the Owner, Contractor and each Subcontractor shall maintain, at its own expense, the following insurance coverages on an occurrence basis insuring the Contractor or Subcontractor as applicable, its employees and agents, and the Indemnities as required in Section 3.18, which insurance shall be provided by insurance companies rated at least A / XIV by Best’s Key Rating Guide and shall incorporate a provision requiring the giving of written notice to Owner at least thirty (30) days prior to the cancellation, non-renewal, or material modification of any such policies.

§ 11.1.6.1 Contractor and the Subcontractors shall not commence Work under this Contract until all insurance required below is obtained and approved by the Owner:

§ 11.1.6.2 Commercial General Liability Insurance (including limited form contractual liability and completed operations, explosion, collapse and underground hazards), covering personal injury, bodily injury and property damage in the amount of One Million Dollars ($1,000,000) per occurrence and Two Million Dollars ($2,000,000) aggregate.

§ 11.1.6.3 Automobile Liability Insurance, including hired and non-owned vehicles, if any, in the amount of One Million Dollars ($1,000,000) covering personal injury, bodily injury and property damage.

§ 11.1.6.4 Workmen’s Compensation Insurance in the amount of the statutory minimum with an Employer’s Liability coverage of at least Five Hundred Thousand Dollars ($500,000).

§ 11.1.6.5 Umbrella / excess insurance coverage with a limit of at least Two Million Dollars ($2,000,000).

§ 11.1.6.6 Failure of either the Architect or Owner to demand certificates of insurance and/or policies and/or endorsements shall not constitute a waiver of the Contractor’s and Subcontractor’s responsibilities under this Article 11. Nor shall review and/or approval by either the Owner or Architect in any way relieve Contractor or any Subcontractor of its responsibility for furnishing sufficient insurance. The endorsements or amendatory riders shall indicate that as respects said additional insureds, there shall be severability of interests under the policies.

§ 11.1.6.7 Under no circumstance shall Contractor be relieved of providing insurance as required by this Article 11. If inspection of certificates, endorsements, or policies by Owner would reasonably reveal any deficiencies in coverage as required, Contractor shall not be relieved of its obligation to provide insurance coverages as required herein and may not assert any defense of waiver, acquiescence, estoppel, or otherwise by the failure of Owner or its agents to object to the form of the certificate, endorsements, or policies, or other documents provided by the Contractor.

§ 11.1.7 Contractor shall also protect the Owner by specifically incorporating this Article 11 into every Subcontract entered into and also requiring that every Subcontractor incorporate this Article and its coverage requirements into every sub-subcontract it enters into. Notwithstanding this requirement, this Article 11 is deemed incorporated into every Subcontract and sub-subcontract via such document’s flow-through provisions.

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§ 11.1.8 Liability of Contractor or Subcontractor is not limited by these insurance requirements or by actual insurance coverage. Nothing contained in the insurance requirements of the Contract Documents is to be construed as limiting the liability of the Contractor, the liability of any Subcontractor of any tier, or the liability of the Architect, or any of their respective insurance carriers. Owner does not, in any way, represent that the coverages or limits of insurance specified are sufficient or adequate to protect the Owner, Contractor, Architect, or any Subcontractor's interest or liabilities, but are merely minimums. The obligation of the Contractor and every Subcontractor of any tier to purchase insurance shall not, in any way, limit their obligations to the Owner in the event that the Owner should suffer an injury or loss in excess of the amount recoverable through insurance, or any loss or portion of the loss which is not covered by either the Architect's, Contractor's or any Subcontractor's insurance.

§ 11.3.1 Unless otherwise provided, the Owner-Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Owner, Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

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The Owner shall purchase and maintain boiler and machinery insurance if required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

... The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.
§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

... The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect’s consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. Owner and Contractor each reserve their respective rights of subrogation.

§ 11.3.8 A loss insured under the Owner’s property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay the Owner and/or Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner’s duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

... § 11.4.1 The Owner shall have the right to require the Contractor to furnish Contract in accordance with the Agreement between the parties. The payment and performance bonds shall strictly comply with the Public Construction Bond Act, 30 ILCS 550/0.01, et seq., and with all provisions of this Article 11.

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§ 11.4.2.1 Prior to commencing Work, Contractor shall furnish a performance bond and a payment bond to the Owner as obligee with a penal sum equal to the Contract Sum including accepted alternates, and if the Contractor is a Construction Manager at-risk who took assignment of trade contracts pursuant to Section 5.1.1, the penal sum of such bonds shall equal the sum of all Subcontractors’ bids, including accepted alternates. The surety for the performance and payment bonds shall be rated not less than A / VI by Best’s Insurance Guide Key.

§ 11.4.3 If at any time the Owner shall become reasonably dissatisfied with any surety, or for any other reason such bonds shall cease to be adequate security for the Owner, Contractor shall, within five (5) days after notice to do so, substitute acceptable bonds in such form and sum and signed by such other surety or sureties as may be reasonably satisfactory to the Owner. No further payment shall be deemed due nor shall be made to Contractor until the new surety or sureties shall have met the Owner’s qualifications.

§ 11.4.4 All performance and payment bonds required by this Article 11 shall be executed in conformity with American Institute of Architects Document A311, or such other form as is acceptable to the Owner. Said bond forms shall be deemed modified to the extent to be consistent with this Article 11. A certified copy of the power of attorney from the surety company stating that the person executing the bond is duly authorized by the surety to execute the bond shall be attached to the bond.

§ 11.4.5 Whenever the Contractor shall be and is declared by the Owner to be in default under the Construction Contract, the surety shall be responsible to compensate the Owner for the following costs incurred by the Owner as they result of the default: 1) any and all extra work and/or corrective work, 2) additional Architect costs, 3) accounting costs, 4) legal costs and reasonable attorneys’ fees, 5) testing, consulting, and other engineering costs, 6) any other costs necessarily incurred and resulting from the default. Notwithstanding, the surety’s obligations shall not exceed the penal sum of the bond.

§ 11.4.6 All terms and conditions of all Contract Documents, including these A201 general conditions, as amended, shall be deemed incorporated by reference into each bond furnished in connection with this Article 11. In case of any conflict between any provision of any performance or payment bond and the Contract Documents, the provisions of the Contract Documents shall prevail to the extent of such conflict.

§ 11.4.7 Any provision of any bond purporting to create a condition precedent for Owner not otherwise contained in the Contract Documents, or which otherwise purports to abrogate or nullify the Owner’s rights or remedies otherwise available in contract, law, or equity, is void. If any provision of any bond purports to shorten the period of limitations and/or the period of repose as provided in Section 13-214 of the Code of Civil Procedure, 735 ILCS 5/13-214, or if any provision of any bond purports to shorten any other applicable statute of limitation or repose, such provision of such bond shall be stricken from such bond prior to execution, and if not stricken shall be deemed null and void, but all other provisions of such bond shall remain enforceable.

§ 11.4.8 In the event any surety shall make any assignment for the benefit of creditors or commit any act of bankruptcy, or is declared bankrupt, or if it shall file a voluntary petition in bankruptcy, or shall in the opinion of the Owner be insolvent, the Contractor shall immediately upon request by the Owner furnish and maintain other bonds satisfactory to the Owner.

§ 11.4.9 No surety shall assert solvency of its principal or its principal’s denial of default as a defense to any claim under any bond furnished in accordance with this Article 11.

...
shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any 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 the Contractor an express, written acceptance of such specific condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

...  

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed on specific items of Work identified as defective, and such extension shall commence upon the performance of corrective Work by the Contractor pursuant to this Section 12.2. Such extension shall expire one year from the date of completion of such corrective Work.

...  

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work. Owner may seek to enforce that obligation or any other obligation arising under the Contract Documents.

§ 12.2.6 All other warranties and guarantees required by the Contract Documents shall be provided to the Architect prior to Substantial Completion, and are separate obligations from the obligations contained in this Section 12.2.

...  

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so by express written notice to the Contractor instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

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The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4. State of Illinois without regard for conflict of law principles.

§ 13.1.1 Contractor and each Subcontractor shall comply with the Illinois Human Rights Act, 775 ILCS 5/2-101 et seq., and Contractor and each Subcontractor hereby certifies that he / she / it has and will maintain at all times during the term of this agreement a written sexual harassment policy in accordance with 775 ILCS 5/2-105(A)(4).

§ 13.1.2 Contractor and each Subcontractor hereby certifies pursuant to Section 33E-11 of the Illinois Criminal Code that he / she / it is not barred from bidding on, or contracting in connection with, the Project as
a result of a conviction for either bid-rigging or bid rotating under Section 33E-3 or 33E-4 of the Criminal Code.

§ 13.1.3 The Contractor and each Subcontractor hereby certifies that he / she / it will provide a drug free workplace in compliance Section 3 of the Drug Free Workplace Act, 30 ILCS 580/3.

§ 13.1.4 At least once per month, the Contractor and each Subcontractor shall submit to the Owner certified payrolls in accordance with Section 5 of the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 13.1.4.1 Upon the Owner’s request, any employee of the Contractor or any employee of any Subcontractor or vendor shall submit state-issued identification documents (e.g. driver’s license, state identification card, etc.) or other documents to the Owner so that the Owner may obtain a criminal background check of the employee. No person who fails or refuses to produce such documents may work on the Project at the Project site. Alternatively, the Owner reserves the right to direct the Contractor, at any time during the Project, to immediately obtain criminal background checks of Contractor’s or Subcontractor’s employees to ascertain whether such employees have been convicted of any offenses. Such criminal background checks will be performed at Contractor’s or Subcontractor’s expense and at no additional cost to Owner. If in the Owner’s sole discretion objectionable information regarding any employee is discovered in the background check, whether performed by Owner or Contractor, such person shall not be allowed to work on the Project at the Project site. The Owner may request new background checks of any employee at any time.

§ 13.1.5 This contract is subject to and shall be construed in accordance with all provisions of law applicable to the Work and the Project. All applicable rules of law shall prevail over any conflicting provision contained in any of the Contract Documents.

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract. Contractor shall not assign the Contract in whole or in part without written consent of the Owner.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner’s rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

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§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear, without markup, costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

...Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located only in accordance with the Local Government Prompt Payment Act, 50 ILCS 505/1, et seq.
§ 13.7 TIME LIMITS ON CLAIMS
The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in no case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

... The Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable evidence as required by Section 2.2.4.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days’ written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages properly executed in conformance with the Contract Documents as of the date of termination.

§ 14.1.4 If the Work is stopped for a period of 60-90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner’s obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days’ written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

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§ 14.2.1 The Owner may terminate the Contract if the Contractor
  1—repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
  2—fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
  3—repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
  4—otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor’s surety, if any, seven days’ written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:
  1—Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
  2—Accept assignment of subcontractors pursuant to Section 5.4, and
  3—Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 The Owner may upon notice to the Contractor terminate its contract with the Contractor or cause the Contractor to terminate any Subcontract with any Subcontractor if:
1. the Contractor or that Subcontractor fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work;

2. the Contractor or that Subcontractor institutes proceedings or consents to proceedings requesting relief under the Federal Bankruptcy Act or any similar federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor or that Subcontractor and such petition is not dismissed within sixty (60) days from the date of filing, or if the Contractor or that Subcontractor admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of such bankruptcy or insolvency;

3. the Contractor or that Subcontractor abandons the Work;

4. the Contractor or that Subcontractor submits an Application for Payment, sworn statement, waiver of lien, certified payroll, affidavit or other document of any nature whatsoever which is intentionally falsified or which the Contractor or that Subcontractor knows to contain a false statement;

5. a mechanic's or materialman’s lien or notice of lien or claim of lien is filed against any part of the Work, the public funds allocated for the Work, or on the site of the Project, if after written demand by the Owner such lien is not promptly released or satisfied; or

6. the Contractor or that Subcontractor disregards any laws, statutes, ordinances, rules, regulations or orders of a governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project.

The termination rights under this Subparagraph 14.2.1 shall be in addition to and not in limitation of any rights or remedies, contractual, statutory or otherwise.

§ 14.2.4 If in the event of termination pursuant to Section 14.2, the Contract Sum shall be reduced by Change Order to reflect any increased costs to the Owner of completing the Work, and if the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect’s services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount all costs to the Owner of completing the Work, the Contractor shall pay the difference to the Owner upon written demand by the Owner. Such costs shall include but not be limited to the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another Contractor or other Subcontractors, any additional interest or fees which the Owner must pay by reason of a delay in completing the Work, reasonable attorneys’ fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. The amount, if any, to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

...
§ 14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed properly executed in conformance with the Contract Documents.

...

A Claim is a demand or assertion by one of the parties, the Contractor seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term “Claim” also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim Contractor.

...

Claims by either the Owner or Contractor must be initiated by written notice to the other party, Owner and to the Initial Decision Maker, if any, with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party, the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant, Contractor first recognizes the condition giving rise to the Claim, whichever is later.

...

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor’s Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. For Claims for Additional Time, to the extent that an equitable extension of Time is warranted, such extension shall be the Contractor’s sole and exclusive remedy.

...

§ 15.1.5.3 For all Claims for Additional Time, the Contractor shall support such Claims in the same manner as supporting additional time for Change Orders.

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1. delay damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

2. damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential delay damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

...

§ 15.2.1 Claims, Claims by the Contractor ("Claims"), excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arbitration or litigation, as the case may be, of any Claim initiated by Contractor and arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

...
§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution. Not be binding.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. In the sole and exclusive discretion of the Owner, all claims, disputes and other matters in question between any of the Architect, Owner, Contractor, Surety, Subcontractor or any material supplier arising out of, or relating to, agreements to which two or more of said parties are bound, or the Contract Documents or the breach thereof, shall, in the case of such election by the Owner, be decided by arbitration. If the Owner elects such arbitration, it shall be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect at the time that the demand is made, as modified herein. In any such arbitration, the arbitrator shall make separate findings as to liability and the amount of damages with respect to each party to the arbitration to the extent any liability or responsibility for damages exists. The Architect, surety, subcontractors and material suppliers who have an interest in the dispute shall be joined as parties to the arbitration. The arbitrator shall have authority to decide all issues between the parties. The foregoing option of the Owner to arbitrate shall be specifically enforceable by the Owner under the prevailing arbitration law. The award rendered by the arbitrator shall
be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but if the Owner elects arbitration, in its sole discretion, notice of the demand for arbitration shall be filed in writing with the other part(ies) to the arbitration and with the American Arbitration Association. Such demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when the institution of legal or equitable proceedings based on the claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the claim; such claim, dispute or other matter in question would otherwise be barred by an applicable statute of limitations or repose. Whether such limitations have been met shall be decided by the arbitrator if contested by a party.

§ 15.4.1.2 All parties shall carry on the Work and perform their duties during any arbitration proceedings, and the Owner shall continue to make payments to the extent required by the Contract Documents. However, at the request of any party, contested payments may be placed in an escrow account pending resolution of the dispute.

§ 15.4.1.3 If the Owner elects arbitration, in its sole discretion, in addition to the other rules of the American Arbitration Association applicable to any arbitration hereunder, the following shall apply:

1. Promptly after the empaneling of the arbitrator, the arbitrator shall establish a procedure for each party to set forth in writing and to serve upon each other party a detailed statement of its contentions of fact and law, along with appropriate responses thereto;

2. All parties to the arbitration shall be entitled to reasonable discovery procedures as provided by the Illinois Code of Civil Procedure and Illinois Supreme Court Rules, as supplemented by rules to be established by the arbitrator;

3. The arbitration shall be commenced and conducted as expeditiously as possible consistent with affording reasonable discovery as provided herein. Similarly, the scope of discovery, and the extent of proceedings hereunder relating to discovery, shall be consistent with the parties' intent that the arbitration be conducted as expeditiously as possible.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof. In the event of any litigation or arbitration between the parties hereunder, the Contractor shall pay the Owner's reasonable attorneys' fees and court costs to the extent the court or tribunal determines the Owner is the prevailing party.

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§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.
§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.
SECTION 00 73 43 - PREVAILING WAGE REQUIREMENTS

1.1 REQUIREMENTS

A. Each Contractor shall comply with requirements of "An Act regulating wages of laborers, mechanics and other workmen employed in any public works by the State, County, City or by any public body or any political subdivision or by anyone under contract for public works".

B. If, during the course of work under this contract, the Department of Labor revises the prevailing rate hourly wages to be paid under this contract for any trade or occupation, Owner, will notify Contractor and each Subcontractor of the changes in the prevailing rate of hourly wages. Contractor shall have the sole responsibility and duty to ensure that the revised prevailing rate of hourly wages is paid by Contractor and all Subcontractors to each worker to whom a revised rate is applicable. Revisions to the prevailing wage as set forth above shall not result in an increase in the Contract Sum.

1.2 ACT AND ORDINANCES

A. "An Act requiring wages of laborers, mechanics and other workmen employed in any public works by the State, County, City of any public body or any political subdivision or by anyone under contract for public works . . . ", Illinois Revised Statutes, 1981, Chapter 48, Sections 39s1 through 39s.

1. A copy of the Illinois Department of Labor Prevailing Wages for McHenry County is included herein. The current rates are effective as of August 15, 2023 on IDOL website.
## McHenry County Prevailing Wage Rates posted on 8/15/2023

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Legend
Rg Region
Type Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers
C Class
Base Base Wage Rate
OT M-F Unless otherwise noted, OT pay is required for any hour greater than 8 worked each day, Mon through Fri. The number listed is the multiple of the base wage.
OT Sa Overtime pay required for every hour worked on Saturdays
OT Su Overtime pay required for every hour worked on Sundays
OT Hol Overtime pay required for every hour worked on Holidays
H/W Health/Welfare benefit
Vac Vacation
Trng Training
Other Ins Employer hourly cost for any other type(s) of insurance provided for benefit of worker.

Explanations MCHENRY COUNTY

FENCE ERECTOR (EAST) - That part of the county East and Northeast of a line following Route 31 North to Route 14, northwest to Route 47 north to the Wisconsin State Line.

IRONWORKERS (EAST) - That part of the county East of Rts. 47 and 14.
IRONWORKERS (SOUTH) - That part of the county South of Route 14 and East of Route 47.

IRONWORKERS (WEST) - That part of the county West of Route 47.

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counts. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS TECHNICIAN

Construction, installation, maintenance and removal of telecommunication facilities (voice, sound, data and video), telephone, security systems, fire alarm systems that are a component of a multiplex system and share a common cable, and data inside wire, interconnect, terminal equipment, central offices, PABX and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area
network), LAN (local area networks), and ISDN (integrated system digital network), pulling of wire in raceways, but not the installation of raceways.

MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyer; Concrete Conveyer (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under; Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derrick, All; Derrick, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoe; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators;
Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators (remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.


Class 7. Mechanics; Welders.

OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines: ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane; Crusher, Stone, etc.; Derrick Boats; Derrick Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin
McHenry County Prevailing Wage Rates posted on 8/15/2023

Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

OPERATING ENGINEERS - FLOATING

Diver. Diver Wet Tender, Diver Tender, ROV Pilot, ROV Tender

TRAFFIC SAFETY Worker I

Traffic Safety Worker I - work associated with the delivery, installation, pick-up and servicing of safety devices during periods of roadway construction, including such work as set-up and maintenance of barricades, barrier wall reflectors, drums, cones, delineators, signs, crash attenuators, glare screen and other such items, and the layout and application or removal of conflicting and/or temporary roadway markings utilized to control traffic in construction zones, as well as flagging for these operations.

TRAFFIC SAFETY WORKER II

Work associated with the installation and removal of permanent pavement markings and/or pavement markers including both installations performed by hand and installations performed by truck.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers
hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

MATERIAL TESTER & MATERIAL TESTER/INSPECTOR I AND II

Notwithstanding the difference in the classification title, the classification entitled "Material Tester I" involves the same job duties as the classification entitled "Material Tester/Inspector I". Likewise, the classification entitled "Material Tester II" involves the same job duties as the classification entitled "Material Tester/Inspector II".
SECTION 01 10 00 - SUMMARY

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:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: University Center at MCC

1. Project Location: 222 E. Church Street, Woodstock, IL 60098.

B. Owner: The Board of Trustees, McHenry County College.

1. Owner's Representative: Mr. Dave Dammon, Director of Facilities

C. Architect: Demonica Kemper Architects, LLC.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents.

B. Type of Contract:

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

C. Insurance:

1. Designated Purchaser:
a. Contractor shall purchase and maintain Builder’s Risk Insurance in accordance with the General Conditions.

1.5 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

   a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations. Contractor shall photo-document condition of existing facilities prior to beginning work to identify any damage that exists prior to beginning work.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Date of Commencement: Work may commence on site on or after November 1, 2023, pending receipt of building permit.

C. Date of Substantial Completion: Work must be substantially complete on or before June 30, 2024.

D. Liquidated Damages: Refer to Article 9.8.8 of the General Conditions of the contract for construction for Liquidated Damages associated with this project. Liquidated Damages shall be in the amount of $1,000.00 per calendar day and shall apply to each phase of work.

E. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 10:00 p.m., Monday through Friday, unless otherwise indicated.

   1. Weekend Hours: All weekend work must be coordinated with the Owner prior to commencement.
   2. All work must comply with noise level restrictions set by the Woodstock City Code.
F. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than three days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.
3. Schedule all interruptions to occur between 10:00 pm and 6:00 am.

G. Nonsmoking Campus: Smoking is not permitted on Campus.

H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

I. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

J. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00
SECTION 01 21 00 - ALLOWANCES

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 governing allowances.
B. Related Requirements:
   1. Section 01 22 00 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.
   2. Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS
A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE
A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS
A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS
A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.9 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
   1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.10 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.11 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
   1. Include installation costs in purchase amount only where indicated as part of the allowance.
   2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
   3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
   4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
   1. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

B. See Construction Manager’s “Scope of Work” documents for allowances to be included by each Contractor.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Include an allowance of $20,000.00 for unforeseen conditions.

END OF SECTION 01 21 00
SECTION 01 23 00 - ALTERNATES

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 alternates.

1.3 DEFINITIONS
A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternate described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES
A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. ALTERNATE NO. 1: Deduct from the Lump Sum Base Bid to eliminate the Liquidated Damages Clause from the contract.

B. ALTERNATE NO. 2: Add to the Lump Sum Base Bid to provide Trane BAC Controls in lieu of individual thermostat control for the air handling units. Refer to Mechanical Drawings / Specs for additional scope details.

C. ALTERNATE NO. 3: Add / Deduct to the Lump Sum Base Bid to provide electrical switchboard equipment from additional vendors. Refer to specification 26 24 13 Switchboards for additional information.

END OF SECTION 01 23 00
SECTION 01 25 00 - 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.
   B. Related Requirements:
      1. Section 01 23 00 "Alternates" for products selected under an alternate.
      2. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

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.
      1. Substitution Request Form: Use CSI Form 13.1A.
      2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
         a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
         b. Coordination 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 substitution 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 and 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.

j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. 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 within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.


b. 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.
PART 2 - PRODUCTS

2.1 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 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00
SECTION 01 26 00 - CONTRACT MODIFICATION 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 handling and processing Contract modifications.

B. Related Requirements:

1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions" or similar form.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

   a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

   b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

   c. Include costs of labor and supervision directly attributable to the change.

   d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." or similar forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES


1.7 CONSTRUCTION CHANGE DIRECTIVE

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00
SECTION 01 29 00 - PAYMENT 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 necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:
   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

   1) Labor.
   2) Materials.
   3) Equipment.


4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Payroll Certification: Submit Payroll Certification in accordance with the Prevailing Wage Act as amended in Public Act 094-0515, including, but not limited to, the following:

1. Certified payroll for all laborers, mechanics, and other workers employed on the project, including each worker's name, address, telephone number (when available,) social security number, classification, the hourly wages paid in each pay period, the number of hours worked each day, and the starting and ending times of work each day.

2. Statement signed by the contractor or subcontractor which states that:

   a. Such records are true and accurate;

   b. The hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required by the Prevailing Wage Act;
c. The contractor or subcontractor is aware that filing a certified payroll that he/she knows to be false is a Class B misdemeanor. A General Contractor is not prohibited from relying on the certification of a lower tier subcontractor, provided the General Contractor does not knowingly rely on a subcontractor's false certification. Any contractor or subcontractor subject to the Prevailing Wage Act who fails to submit a certified payroll or knowingly files a false certified payroll is in violation of the Prevailing Wage Act and guilty of a Class B misdemeanor.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
   b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
   c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
12. Initial progress report.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.

J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00
SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

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. Requests for Information (RFIs).
4. Project Web site.
5. Project meetings.

B. Related Requirements:

1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: 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, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
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 telephone numbers, including home, office, 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, on Project Web site, and by each temporary telephone. 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. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

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

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities 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.

D. Conservation: Coordinate construction activities to ensure that operations are carried out 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.
1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

   a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

   b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

   c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

   d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.

   e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.

   f. Indicate required installation sequences.

   g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.

2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.

3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.

4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

6. Mechanical and Plumbing Work: Show the following:
a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor’s responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.

a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
b. Digital Data Software Program: Drawings are available in Revit 2014.
c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
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. RFI number, numbered sequentially.
6. RFI subject.
7. Specification Section number and title and related paragraphs, as appropriate.
8. Drawing number and detail references, as appropriate.
9. Field dimensions and conditions, as appropriate.
10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
11. Contractor's signature.
12. 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. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. RFI number including RFIs that were returned without action or withdrawn.
4. RFI description.
5. Date the RFI was submitted.

1.8 PROJECT WEB SITE

A. Provide, administer, and use Project Web site for purposes of hosting and managing project communication and documentation until Final Completion. Project Web site shall include the following functions:

1. Project directory.
2. Project correspondence.
3. Meeting minutes.
5. RFI forms and logs.
6. Task and issue management.
7. Photo documentation.
8. Schedule and calendar management.
10. Payment application forms.
11. Drawing and specification document hosting, viewing, and updating.
13. Reminder and tracking functions.

B. On completion of Project, provide one complete archive copy(ies) of Project Web site files to Owner and to Architect in a digital storage format acceptable to Architect.

C. Provide the following Project Web site software packages under their current published licensing agreements:
   1. Procore
   2. Autodesk Plangrid
   3. Submittal Exchange

D. Contractor, subcontractors, and other parties granted access by Contractor to Project Web site shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.

1.9 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.
   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. Conduct the conference to review responsibilities and personnel assignments.
   2. 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.
   3. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule.
      b. Phasing.
      c. Critical work sequencing and long-lead items.
      d. Designation of key personnel and their duties.
      e. Lines of communications.
      f. Procedures for processing field decisions and Change Orders.
      g. Procedures for RFI's.
      h. Procedures for testing and inspecting.
4. 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 that requires coordination with other construction.

1. Attendees:  Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting.  Advise 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:

   b. Options.
   c. Related RFIs.
   d. Related Change Orders.
   e. Purchases.
   f. Deliveries.
   g. Submittals.
   h. Review of mockups.
   i. Possible conflicts.
   j. Compatibility requirements.
   k. Time schedules.
   l. Weather limitations.
   m. Manufacturer's written instructions.
   n. Warranty requirements.
   o. Compatibility of materials.
   p. Acceptability of substrates.
   q. Temporary facilities and controls.
   r. Space and access limitations.
   s. Regulations of authorities having jurisdiction.
   t. Testing and inspecting requirements.
   u. Installation procedures.
   v. Coordination with other work.
   w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to 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. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
   a. Preparation of record documents.
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   c. Submittal of written warranties.
   d. Requirements for preparing operations and maintenance data.
   e. Requirements for delivery of material samples, attic stock, and spare parts.
   f. Requirements for demonstration and training.
   g. Preparation of Contractor's punch list.
   h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
   i. Submittal procedures.
   j. Coordination of separate contracts.
   k. Owner's partial occupancy requirements.
   l. Installation of Owner's furniture, fixtures, and equipment.
   m. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at weekly 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) Resolution of BIM component conflicts.
4) Status of submittals.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site utilization.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of proposal requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) 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.

F. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

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

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
a. Combined Contractor's Construction Schedule: Review progress since
the last coordination meeting. Determine whether each contract is on
time, ahead of schedule, or behind schedule, in relation to combined
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.

b. Schedule Updating: Revise combined Contractor's construction
schedule after each coordination meeting where revisions to the
schedule have been made or recognized. Issue revised schedule
concurrently with report of each meeting.

c. Review present and future needs of each contractor present, including
the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

3. 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 01 31 00
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 documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.

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

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

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

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from [commencement of the Work] [the Notice to Proceed] until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.
G. Material Location Reports: Submit at monthly intervals.

H. Site Condition Reports: Submit at time of discovery of differing conditions.

I. Special Reports: Submit at time of unusual event.

J. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including work stages.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittals times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Products Ordered in Advance: Include a separate activity for each product.
   Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicate the earliest possible delivery date.
2. Owner-Furnished Products: Include a separate activity for each product.
   Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use of premises restrictions.
   g. Seasonal variations.
   h. Environmental control.

4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
   a. Subcontract awards.
   b. Submittals.
   c. Purchases.
   d. Mockups.
   e. Fabrication.
   f. Sample testing.
   g. Deliveries.
   h. Installation.
   i. Tests and inspections.
   j. Adjusting.
   k. Curing.
   l. Startup and placement into final use and operation.
5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
   a. Structural completion.
   b. Temporary enclosure and space conditioning.
   c. Permanent space enclosure.
   d. Completion of mechanical installation.
   e. Completion of electrical installation.
   f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
   1. Temporary enclosure and space conditioning.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
   1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
   1. Unresolved issues.
   2. Unanswered Requests for Information.
   3. Rejected or unreturned submittals.
   4. Notations on returned submittals.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

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

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
   a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
   a. Preparation and processing of submittals.
   b. Mobilization and demobilization.
   c. Purchase of materials.
   d. Delivery.
   e. Fabrication.
   f. Utility interruptions.
   g. Installation.
   h. Testing and commissioning.
   i. Punch list and final completion.
   j. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
   a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
   a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
   b. Total cost assigned to activities shall equal the total Contract Sum.

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

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
   1. Contractor or subcontractor and the Work or activity.
   2. Description of activity.
   3. Main events of activity.
   4. Immediate preceding and succeeding activities.
   5. Early and late start dates.
   6. Early and late finish dates.
   7. Activity duration in workdays.
   8. Total float or slack time.
   10. Dollar value of activity (coordinated with the schedule of values).

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

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

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

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

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate final completion percentage for each activity.

END OF SECTION 01 32 00
SECTION 01 33 00 - SUBMITTAL 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 requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
   a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:
   a. Scheduled date for first submittal.
   b. Specification Section number and title.
   c. Submittal category: Action; informational.
   d. Name of subcontractor.
   e. Description of the Work covered.
   f. Scheduled date for Architect's final release or approval.
   g. Scheduled date of fabrication.
   h. Scheduled dates for purchasing.
   i. Scheduled dates for installation.
   j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

   a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
   c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
   d. The following digital data files will be furnished for each appropriate discipline:
      1) Floor plans.
      2) Reflected ceiling plans.
B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect’s receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

   1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 15 days for review of each resubmittal.
   4. Sequential Review: Where sequential review of submittals by Architect’s consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
   5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect’s consultants, Owner, or other parties is indicated, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

   1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.
      a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
   3. Provide means for insertion to permanently record Contractor’s review and approval markings and action taken by Architect.
   4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of firm or entity that prepared submittal.
g. Names of subcontractor, manufacturer, and supplier.
h. Category and type of submittal.
i. Submittal purpose and description.
j. Specification Section number and title.
k. Specification paragraph number or drawing designation and generic name for each of multiple items.
l. Drawing number and detail references, as appropriate.
m. Location(s) where product is to be installed, as appropriate.
n. Related physical samples submitted directly.
o. Indication of full or partial submittal.
p. Transmittal number, numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

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

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
   b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:
   a. Manufacturer’s catalog cuts.
   b. Manufacturer’s product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams showing factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:
   a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
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e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.

3. Submit Shop Drawings in the following format:
   a. PDF electronic file.

4. BIM File Incorporation: Develop and incorporate Shop Drawing files into Building Information Model established for Project.
   a. Prepare Shop Drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
   b. Refer to Section 01 31 00 "Project Management and Coordination" for requirements for coordination drawings.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
   e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
a. **Number of Samples:** Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. **Samples for Verification:** Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. **Number of Samples:** Submit three sets of Samples. Architect will retain one Sample; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

1) **Submit a single Sample** where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

2) **If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample,** submit at least three sets of paired units that show approximate limits of variations.

**E. Product Schedule:** As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. **Type of product.** Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. **Manufacturer and product name, and model number if applicable.**
3. **Number and name of room or space.**
4. **Location within room or space.**
5. **Submit product schedule in the following format:**

   a. **PDF electronic file.**

**F. Coordination Drawing Submittals:** Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."

**G. Contractor's Construction Schedule:** Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."

**H. Application for Payment and Schedule of Values:** Comply with requirements specified in Section 01 29 00 "Payment Procedures."

**I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals:** Comply with requirements specified in Section 01 40 00 "Quality Requirements."

**J. Closeout Submittals and Maintenance Material Submittals:** Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
K. Maintenance Data: Comply with requirements specified in Section 01 78 23 “Operation and Maintenance Data.”

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

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

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

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

P. Product Certificates: Submit written statements on manufacturer’s letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer’s letterhead certifying that material complies with requirements in the Contract Documents.

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

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

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers’ names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency’s standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency’s standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

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

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

C. BIM File Incorporation: Incorporate delegated-design drawing and data files into Building Information Model established for Project.

1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

PART 3 - EXECUTION

3.1 CONTRACTOR’S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."
C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01 33 00
SECION 01 40 00 - QUALITY REQUIREMENTS

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 quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.

3. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

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

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

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

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

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

1.4 CONFLICTING REQUIREMENTS

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

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

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.


D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
1.6 CONTRACTOR’S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

A. Manufacturer’s Technical Representative’s Field Reports: Prepare written information documenting manufacturer’s technical representative’s tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.
B. Factory-Authorized Service Representative’s Reports: Prepare written information documenting manufacturer’s factory-authorized service representative’s tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

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

1.8 QUALITY ASSURANCE

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

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

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

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

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

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

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

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

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

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

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 “Submittal Procedures.”

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

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


1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Contractor.
G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

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

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

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

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

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

END OF SECTION 01 40 00
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": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
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 in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

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<th>Abbreviation</th>
<th>Description</th>
<th>Phone</th>
<th>Website</th>
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<tbody>
<tr>
<td>AA</td>
<td>Aluminum Association (The)</td>
<td>(703) 358-2960</td>
<td><a href="http://www.aluminum.org">www.aluminum.org</a></td>
</tr>
<tr>
<td>AABC</td>
<td>Associated Air Balance Council</td>
<td>(202) 737-0202</td>
<td><a href="http://www.aabchq.com">www.aabchq.com</a></td>
</tr>
<tr>
<td>AAMA</td>
<td>American Architectural Manufacturers Association</td>
<td>(847) 303-5664</td>
<td><a href="http://www.aamanet.org">www.aamanet.org</a></td>
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<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
<td>(202) 624-5800</td>
<td><a href="http://www.transportation.org">www.transportation.org</a></td>
</tr>
<tr>
<td>AATCC</td>
<td>American Association of Textile Chemists and Colorists</td>
<td>(919) 549-8141</td>
<td><a href="http://www.aatcc.org">www.aatcc.org</a></td>
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<tr>
<td>ABAA</td>
<td>Air Barrier Association of America</td>
<td>(866) 956-5888</td>
<td><a href="http://www.airbarrier.org">www.airbarrier.org</a></td>
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<tr>
<td>ABMA</td>
<td>American Bearing Manufacturers Association</td>
<td>(202) 367-1155</td>
<td><a href="http://www.abma-dc.org">www.abma-dc.org</a></td>
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<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
<td>(248) 848-3700</td>
<td><a href="http://www.concrete.org">www.concrete.org</a></td>
</tr>
<tr>
<td>ACPA</td>
<td>American Concrete Pipe Association</td>
<td>(972) 506-7216</td>
<td><a href="http://www.concrete-pipe.org">www.concrete-pipe.org</a></td>
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<tr>
<td>AEIC</td>
<td>Association of Edison Illuminating Companies, Inc. (The)</td>
<td>(205) 257-2530</td>
<td><a href="http://www.aeic.org">www.aeic.org</a></td>
</tr>
<tr>
<td>AF&amp;PA</td>
<td>American Forest &amp; Paper Association</td>
<td>(800) 878-8878</td>
<td><a href="http://www.afandpa.org">www.afandpa.org</a></td>
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<tr>
<td>AGA</td>
<td>American Gas Association</td>
<td>(202) 824-7000</td>
<td><a href="http://www.aga.org">www.aga.org</a></td>
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<tr>
<td>AHAM</td>
<td>Association of Home Appliance Manufacturers</td>
<td>(202) 872-5955</td>
<td><a href="http://www.aham.org">www.aham.org</a></td>
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www.ahrinet.org

AI  Asphalt Institute  www.asphaltinstitute.org  (859) 288-4960

AIA  American Institute of Architects (The)  www.aia.org  (800) 242-3837  (202) 626-7300

AISC  American Institute of Steel Construction  www.aisc.org  (800) 644-2400  (312) 670-2400

AISI  American Iron and Steel Institute  www.steel.org  (202) 452-7100

AITC  American Institute of Timber Construction  www.aite-glulam.org  (303) 792-9559

ALSC  American Lumber Standard Committee, Incorporated  www.alsc.org  (301) 972-1700


ANSI  American National Standards Institute  www.ansi.org  (202) 293-8020

AOSA  Association of Official Seed Analysts, Inc.  www.aosaseed.com  (405) 780-7372

APA  APA - The Engineered Wood Association  www.apawood.org  (253) 565-6600

APA  Architectural Precast Association  www.archprecast.org  (239) 454-6989

API  American Petroleum Institute  www.api.org  (202) 682-8000

ARI  Air-Conditioning & Refrigeration Institute  www.ari.org  (703) 524-8800

ARMA  Asphalt Roofing Manufacturers Association  www.asphaltroofing.org  (202) 207-0917

ASCE  American Society of Civil Engineers  www.asce.org  (800) 548-2723  (703) 295-6300

ASCE/SEI  American Society of Civil Engineers/Structural Engineering Institute  (See ASCE)

ASHRAE  American Society of Heating, Refrigerating and Air-Conditioning Engineers  www.ashrae.org  (800) 527-4723  (404) 636-8400

ASME  ASME International  (800) 843-2763
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<thead>
<tr>
<th>Organization</th>
<th>Phone 1</th>
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<tr>
<td>ASSE</td>
<td>(440) 835-3040</td>
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<td>ASTM (American Society for Testing</td>
<td>(610) 832-9500</td>
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<td>and Materials International)</td>
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<td>ATIS</td>
<td>(202) 628-6380</td>
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<td>AWCMA (American Window Covering</td>
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<tr>
<td>AWCI</td>
<td>(703) 534-8300</td>
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<td>AWI</td>
<td>(571) 323-3636</td>
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<td>AWPA</td>
<td>(205) 733-4077</td>
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<td>AWS</td>
<td>(800) 443-9353</td>
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<td>AWWA</td>
<td>(800) 926-7337</td>
<td>(303) 794-7711</td>
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<td>BHMA</td>
<td>(212) 297-2122</td>
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<td>(703) 620-0010</td>
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<td>BICSI</td>
<td>(800) 242-7405</td>
<td>(813) 979-1991</td>
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<td>BIFMA (Business and Institutional</td>
<td>(616) 285-3963</td>
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<td>BISSC</td>
<td>(866) 342-4772</td>
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<td>CCC</td>
<td>(610) 527-3880</td>
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<td>(800) 232-3282</td>
<td>(212) 251-7200</td>
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<td>CEA</td>
<td>(613) 230-9263</td>
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<td>CFFA</td>
<td>Chemical Fabrics &amp; Film Association, Inc.</td>
<td><a href="http://www.chemicalfabricsandfilm.com">www.chemicalfabricsandfilm.com</a></td>
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<td>CGA</td>
<td>Compressed Gas Association</td>
<td><a href="http://www.cganet.com">www.cganet.com</a></td>
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<td>CIMA</td>
<td>Cellulose Insulation Manufacturers Association</td>
<td><a href="http://www.cellulose.org">www.cellulose.org</a></td>
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<td>CISCA</td>
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<td><a href="http://www.cisca.org">www.cisca.org</a></td>
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<td>CISPI</td>
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<td><a href="http://www.cispi.org">www.cispi.org</a></td>
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<td><a href="http://www.chainlinkinfo.org">www.chainlinkinfo.org</a></td>
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<td>CPA</td>
<td>Composite Panel Association</td>
<td><a href="http://www.pbmdf.com">www.pbmdf.com</a></td>
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<td>CRI</td>
<td>Carpet and Rug Institute (The)</td>
<td><a href="http://www.carpet-rug.com">www.carpet-rug.com</a></td>
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<td>CRRC</td>
<td>Cool Roof Rating Council</td>
<td><a href="http://www.coolroofs.org">www.coolroofs.org</a></td>
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<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
<td><a href="http://www.crsi.org">www.crsi.org</a></td>
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<td>CRRC</td>
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<td>CSA</td>
<td>Canadian Standards Association</td>
<td><a href="http://www.csa.ca">www.csa.ca</a></td>
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<td>(Formerly: IAS - International Approval Services)</td>
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<td>Construction Specifications Institute (The)</td>
<td><a href="http://www.csinet.org">www.csinet.org</a></td>
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<td>CSSB</td>
<td>Cedar Shake &amp; Shingle Bureau</td>
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<td>ECA</td>
<td><a href="http://www.ec-central.org">www.ec-central.org</a></td>
<td>(703)907-8024</td>
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<td>EIA</td>
<td><a href="http://www.eia.org">www.eia.org</a></td>
<td>(703) 907-7500</td>
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<td>EIMA</td>
<td><a href="http://www.eima.com">www.eima.com</a></td>
<td>(800) 294-3462, (770) 968-7945</td>
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<td>EJCA</td>
<td><a href="http://content.asce.org/ejcc/">http://content.asce.org/ejcc/</a></td>
<td>(703) 295-6000</td>
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<td>EJMA</td>
<td><a href="http://www.ejma.org">www.ejma.org</a></td>
<td>(914) 332-0040</td>
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<td>ESD</td>
<td><a href="http://www.esda.org">www.esda.org</a></td>
<td>(315) 339-6937</td>
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<td>ETL SEMCO</td>
<td><a href="http://www.intertek-etlsemko.com">www.intertek-etlsemko.com</a></td>
<td>(800) 967-5352</td>
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<td>FIBA</td>
<td><a href="http://www.fiba.com">www.fiba.com</a></td>
<td>41 22 545 00 00</td>
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<td>FIVB</td>
<td><a href="http://www.fivb.ch">www.fivb.ch</a></td>
<td>41 21 345 35 35</td>
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<tr>
<td>FM Approvals</td>
<td><a href="http://www.fmglobal.com">www.fmglobal.com</a></td>
<td>(781) 762-4300</td>
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<td>FM Global</td>
<td><a href="http://www.fmglobal.com">www.fmglobal.com</a></td>
<td>(401) 275-3000</td>
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<tr>
<td>FRSA</td>
<td><a href="http://www.floridaroof.com">www.floridaroof.com</a></td>
<td>(407) 671-3772</td>
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<tr>
<td>FSA</td>
<td><a href="http://www.fluidsealing.com">www.fluidsealing.com</a></td>
<td>(610) 971-4850</td>
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<td>FSC</td>
<td><a href="http://www.fsc.org">www.fsc.org</a></td>
<td>49 228 367 66 0</td>
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<td>GA</td>
<td><a href="http://www.gypsum.org">www.gypsum.org</a></td>
<td>(301) 277-8686</td>
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<td>GANA</td>
<td><a href="http://www.glasswebsite.com">www.glasswebsite.com</a></td>
<td>(785) 271-0208</td>
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<td>(Part of GSI)</td>
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<td>Green Seal</td>
<td><a href="http://www.greenseal.org">www.greenseal.org</a></td>
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<td>Geosynthetic Institute</td>
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<td>HI</td>
<td>Hydronics Institute</td>
<td><a href="http://www.gamanet.org">www.gamanet.org</a></td>
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<td>HI/GAMA</td>
<td>Hydronics Institute/Gas Appliance Manufacturers Association</td>
<td>Division of Air-Conditioning, Heating, and Refrigeration Institute (AHRI)</td>
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<td>HMMA</td>
<td>Hollow Metal Manufacturers Association</td>
<td>(Part of NAAMM)</td>
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<td>Hardwood Plywood &amp; Veneer Association</td>
<td><a href="http://www.hpva.org">www.hpva.org</a></td>
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<td>HPW</td>
<td>H. P. White Laboratory, Inc.</td>
<td><a href="http://www.hpwhite.com">www.hpwhite.com</a></td>
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<td>IAPSC</td>
<td>International Association of Professional Security Consultants</td>
<td><a href="http://www.iapsc.org">www.iapsc.org</a></td>
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<tr>
<td>ICBO</td>
<td>International Conference of Building Officials</td>
<td><a href="http://www.iccsafe.org">www.iccsafe.org</a></td>
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<td>ICEA</td>
<td>Insulated Cable Engineers Association, Inc.</td>
<td><a href="http://www.icea.net">www.icea.net</a></td>
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<td>ICRI</td>
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<td>International Cast Polymer Association</td>
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<td>IEC</td>
<td>International Electrotechnical Commission</td>
<td><a href="http://www.iec.ch">www.iec.ch</a></td>
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<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers, Inc. (The)</td>
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<td>IES</td>
<td>Illuminating Engineering Society of North America</td>
<td><a href="http://www.iesna.org">www.iesna.org</a></td>
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<td>IEST</td>
<td>Institute of Environmental Sciences and Technology</td>
<td><a href="http://www.iest.org">www.iest.org</a></td>
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<td>IGMA</td>
<td>Insulating Glass Manufacturers Alliance</td>
<td><a href="http://www.igmaonline.org">www.igmaonline.org</a></td>
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<td>ISO</td>
<td>International Organization for Standardization</td>
<td><a href="http://www.iso.ch">www.iso.ch</a></td>
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<td>ISSFA</td>
<td>International Solid Surface Fabricators Association</td>
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<td>ITS</td>
<td>Intertek Testing Service NA</td>
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<td>Kitchen Cabinet Manufacturers Association</td>
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<td>LGSEA</td>
<td>Light Gauge Steel Engineers Association</td>
<td><a href="http://www.arcat.com">www.arcat.com</a></td>
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<td>LMA</td>
<td>Laminating Materials Association</td>
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<td>MBMA</td>
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<td>NAAMM</td>
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<td>(630) 942-6591</td>
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<td>NADCA</td>
<td>National Air Duct Cleaners Association</td>
<td>(202) 737-2926</td>
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<td>NAGWS</td>
<td>National Association for Girls and Women in Sport</td>
<td>(800) 213-7193, ext. 453</td>
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<td>National Building Granite Quarries Association, Inc.</td>
<td>(800) 557-2848</td>
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<td>NCAA</td>
<td>National Collegiate Athletic Association (The)</td>
<td>(317) 917-6222</td>
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<td>NCMA</td>
<td>National Concrete Masonry Association</td>
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<td>NEBB</td>
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<td>NECA</td>
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<td>(301) 657-3110</td>
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<td>NeLMA</td>
<td>Northeastern Lumber Manufacturers’ Association</td>
<td>(207) 829-6901</td>
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<td>NEMA</td>
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<td>(703) 841-3200</td>
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<td>NETA</td>
<td>InterNational Electrical Testing Association</td>
<td>(888) 300-6382</td>
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<td><a href="http://www.netaworld.org">www.netaworld.org</a></td>
<td>(269) 488-6382</td>
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<td>NFHS</td>
<td>National Federation of State High School Associations</td>
<td>(317) 972-6900</td>
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<td>NFPA</td>
<td>NFPA (National Fire Protection Association)</td>
<td>(800) 344-3555</td>
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<td><a href="http://www.nfpa.org">www.nfpa.org</a></td>
<td>(617) 770-3000</td>
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<td>NFRC</td>
<td>National Fenestration Rating Council</td>
<td>(301) 589-1776</td>
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<td>NGA</td>
<td>National Glass Association</td>
<td>(866) 342-5642</td>
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<td><a href="http://www.glass.org">www.glass.org</a></td>
<td>(703) 442-4890</td>
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REFERENCES

Section 01 42 00

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MCHENRY COUNTY COLLEGE
University Center at MCC

NHLA National Hardwood Lumber Association
(800) 933-0318
www.natthrowdwood.org
(901) 377-1818

NLGA National Lumber Grades Authority
(604) 524-2393
www.nlga.org

NOFMA NOFMA: The Wood Flooring Manufacturers Association
(Formerly: National Oak Flooring Manufacturers Association)
(901) 526-5016
www.nofma.org

NOMMA National Ornamental & Miscellaneous Metals Association
(888) 516-8585
www.nomma.org

NRCA National Roofing Contractors Association
(800) 323-9545
www.nrca.net
(847) 299-9070

NRMCA National Ready Mixed Concrete Association
(888) 846-7622
www.nrmca.org
(301) 587-1400

NSF NSF International
(800) 673-6275
(National Sanitation Foundation International)
(734) 769-8010
www.nsf.org

NSSGA National Stone, Sand & Gravel Association
(800) 342-1415
www.nssga.org
(703) 525-8788

NTMA National Terrazzo & Mosaic Association, Inc. (The)
(800) 323-9736
www.ntma.com
(540) 751-0930

NWFA National Wood Flooring Association
(800) 422-4556
www.nwfa.org
(636) 519-9663

PCI Precast/Prestressed Concrete Institute
(312) 786-0300
wwweci.org

PDI Plumbing & Drainage Institute
(800) 589-8956
www.pdionline.org
(978) 557-0720

PGI PVC Geomembrane Institute
(217) 333-3929
http://pgi-tp.cee.uiuc.edu

PTI Post-Tensioning Institute
(248) 848-3180
www.post-tensioning.org

RCSC Research Council on Structural Connections
www.boltcouncil.org

RFCI Resilient Floor Covering Institute
(706) 882-3833
www.rfci.com

RIS Redwood Inspection Service
(925) 935-1499
www.redwoodinspection.com

SAE SAE International
(877) 606-7323
www.sae.org
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<td></td>
<td><a href="http://www.aqmd.com">www.aqmd.com</a></td>
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<tr>
<td><strong>SCTE</strong></td>
<td>Society of Cable Telecommunications Engineers</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.scte.org">www.scte.org</a></td>
</tr>
<tr>
<td><strong>SDI</strong></td>
<td>Steel Deck Institute</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.sdi.org">www.sdi.org</a></td>
</tr>
<tr>
<td><strong>SDI</strong></td>
<td>Steel Door Institute</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.steeldoor.org">www.steeldoor.org</a></td>
</tr>
<tr>
<td><strong>SEFA</strong></td>
<td>Scientific Equipment and Furniture Association</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.sefalabs.com">www.sefalabs.com</a></td>
</tr>
<tr>
<td><strong>SEI/ASCE</strong></td>
<td>Structural Engineering Institute/American Society of Civil Engineers</td>
</tr>
<tr>
<td></td>
<td>(See ASCE)</td>
</tr>
<tr>
<td><strong>SIA</strong></td>
<td>Security Industry Association</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.siaonline.org">www.siaonline.org</a></td>
</tr>
<tr>
<td><strong>SJI</strong></td>
<td>Steel Joist Institute</td>
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<tr>
<td></td>
<td><a href="http://www.steeljoist.org">www.steeljoist.org</a></td>
</tr>
<tr>
<td><strong>SMA</strong></td>
<td>Screen Manufacturers Association</td>
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<td><a href="http://www.smcentral.org">www.smcentral.org</a></td>
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<tr>
<td><strong>SMACNA</strong></td>
<td>Sheet Metal and Air Conditioning Contractors' National Association</td>
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<td><a href="http://www.smacna.org">www.smacna.org</a></td>
</tr>
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<td><strong>SMPTE</strong></td>
<td>Society of Motion Picture and Television Engineers</td>
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<td><a href="http://www.smpte.org">www.smpte.org</a></td>
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<tr>
<td><strong>SPFA</strong></td>
<td>Spray Polyurethane Foam Alliance</td>
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<tr>
<td></td>
<td>(Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)</td>
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<td><a href="http://www.sprayfoam.org">www.sprayfoam.org</a></td>
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<tr>
<td><strong>SPIB</strong></td>
<td>Southern Pine Inspection Bureau (The)</td>
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<tr>
<td></td>
<td><a href="http://www.spib.org">www.spib.org</a></td>
</tr>
<tr>
<td><strong>SPRI</strong></td>
<td>Single Ply Roofing Industry</td>
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<tr>
<td></td>
<td><a href="http://www.spri.org">www.spri.org</a></td>
</tr>
<tr>
<td><strong>SSINA</strong></td>
<td>Specialty Steel Industry of North America</td>
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<tr>
<td></td>
<td><a href="http://www.ssina.com">www.ssina.com</a></td>
</tr>
<tr>
<td><strong>SSPC</strong></td>
<td>SSPC: The Society for Protective Coatings</td>
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<td><a href="http://www.sspc.org">www.sspc.org</a></td>
</tr>
<tr>
<td><strong>STI</strong></td>
<td>Steel Tank Institute</td>
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<td></td>
<td><a href="http://www.steeltank.com">www.steeltank.com</a></td>
</tr>
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</table>

**www.sae.org** (724) 776-4841

**www.scte.org** (800) 542-5040

**www.sdi.org** (610) 363-6888

**www.sheeldoor.org** (847) 458-4647

**www.sefalabs.com** (877) 294-5424

**www.smpte.org** (516) 294-5424

**www.spib.org** (850) 434-2611

**www.spri.org** (781) 647-7026

**www.ssina.com** (800) 982-0355

**www.sspc.org** (202) 342-8630

**www.steeltank.com** (847) 438-8265
<table>
<thead>
<tr>
<th>Acronym</th>
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<tr>
<td>SWI</td>
<td>Steel Window Institute</td>
<td><a href="http://www.steelwindows.com">www.steelwindows.com</a></td>
<td>(216) 241-7333</td>
</tr>
<tr>
<td>SWPA</td>
<td>Submersible Wastewater Pump Association</td>
<td><a href="http://www.swpa.org">www.swpa.org</a></td>
<td>(847) 681-1868</td>
</tr>
<tr>
<td>TCA</td>
<td>Tilt-Up Concrete Association</td>
<td><a href="http://www.tilt-up.org">www.tilt-up.org</a></td>
<td>(319) 895-6911</td>
</tr>
<tr>
<td>TCNA</td>
<td>Tile Council of North America, Inc.</td>
<td><a href="http://www.tileusa.com">www.tileusa.com</a></td>
<td>(864) 646-8453</td>
</tr>
<tr>
<td>TEMA</td>
<td>Tubular Exchanger Manufacturers Association</td>
<td><a href="http://www.tema.org">www.tema.org</a></td>
<td>(914) 332-0040</td>
</tr>
<tr>
<td>TIA/EIA</td>
<td>Telecommunications Industry Association/Electronic Industries Alliance</td>
<td><a href="http://www.tiaonline.org">www.tiaonline.org</a></td>
<td>(703) 907-7700</td>
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<tr>
<td>TMS</td>
<td>The Masonry Society</td>
<td><a href="http://www.masonrysociety.org">www.masonrysociety.org</a></td>
<td>(303) 939-9700</td>
</tr>
<tr>
<td>TPI</td>
<td>Truss Plate Institute, Inc.</td>
<td><a href="http://www.tpinst.org">www.tpinst.org</a></td>
<td>(703) 683-1010</td>
</tr>
<tr>
<td>TPI</td>
<td>Turfgrass Producers International</td>
<td><a href="http://www.turfgrasssod.org">www.turfgrasssod.org</a></td>
<td>(800) 405-8873</td>
</tr>
<tr>
<td>TRI</td>
<td>Tile Roofing Institute</td>
<td><a href="http://www.tileroofing.org">www.tileroofing.org</a></td>
<td>(312) 670-4177</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratories Inc.</td>
<td><a href="http://www.ul.com">www.ul.com</a></td>
<td>(877) 854-3577</td>
</tr>
<tr>
<td>UNI</td>
<td>Uni-Bell PVC Pipe Association</td>
<td><a href="http://www.uni-bell.org">www.uni-bell.org</a></td>
<td>(972) 243-3902</td>
</tr>
<tr>
<td>USAV</td>
<td>USA Volleyball</td>
<td><a href="http://www.usavolleyball.org">www.usavolleyball.org</a></td>
<td>(888) 786-5539</td>
</tr>
<tr>
<td>USGBC</td>
<td>U.S. Green Building Council</td>
<td><a href="http://www.usgbc.org">www.usgbc.org</a></td>
<td>(800) 795-1747</td>
</tr>
<tr>
<td>USITT</td>
<td>United States Institute for Theatre Technology, Inc.</td>
<td><a href="http://www.usitt.org">www.usitt.org</a></td>
<td>(800) 938-7488</td>
</tr>
<tr>
<td>WASTEC</td>
<td>Waste Equipment Technology Association</td>
<td><a href="http://www.wastec.org">www.wastec.org</a></td>
<td>(800) 424-2869</td>
</tr>
<tr>
<td>WCLIB</td>
<td>West Coast Lumber Inspection Bureau</td>
<td><a href="http://www.wclib.org">www.wclib.org</a></td>
<td>(800) 283-1486</td>
</tr>
<tr>
<td>WCMA</td>
<td>Window Covering Manufacturers Association</td>
<td><a href="http://www.wcmanet.org">www.wcmanet.org</a></td>
<td>(212) 297-2122</td>
</tr>
</tbody>
</table>
### B. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Name and Description</th>
<th>Phone</th>
<th>Website</th>
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<tbody>
<tr>
<td>DIN</td>
<td>Deutsches Institut fur Normung e.V.</td>
<td>49 30 2601-0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.din.de">www.din.de</a></td>
</tr>
<tr>
<td>IAPMO</td>
<td>International Association of Plumbing and Mechanical Officials</td>
<td>(909) 472-4100</td>
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<td></td>
<td></td>
<td></td>
<td><a href="http://www.iapmo.org">www.iapmo.org</a></td>
</tr>
<tr>
<td>ICC-ES</td>
<td>ICC Evaluation Service, Inc.</td>
<td>(800) 423-6587</td>
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<td></td>
<td><a href="http://www.icc-es.org">www.icc-es.org</a></td>
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### C. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Name and Description</th>
<th>Phone</th>
<th>Website</th>
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<tr>
<td>COE</td>
<td>Army Corps of Engineers</td>
<td>(202) 761-0011</td>
<td></td>
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<tr>
<td></td>
<td><a href="http://www.usace.army.mil">www.usace.army.mil</a></td>
<td></td>
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</tr>
<tr>
<td>CPSC</td>
<td>Consumer Product Safety Commission</td>
<td>(800) 638-2772</td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.cpsc.gov">www.cpsc.gov</a></td>
<td>(301) 504-7923</td>
<td></td>
</tr>
<tr>
<td>DOC</td>
<td>Department of Commerce</td>
<td>(202) 482-2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.commerce.gov">www.commerce.gov</a></td>
<td></td>
<td></td>
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<tr>
<td>DOD</td>
<td>Department of Defense</td>
<td>(215) 697-6257</td>
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<tr>
<td></td>
<td><a href="http://dodssp.daps.dla.mil">http://dodssp.daps.dla.mil</a></td>
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<tr>
<td>DOE</td>
<td>Department of Energy</td>
<td>(202) 586-9220</td>
<td></td>
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<tr>
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<td><a href="http://www.energy.gov">www.energy.gov</a></td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
<td>(202) 272-0167</td>
<td><a href="http://www.epa.gov">www.epa.gov</a></td>
</tr>
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<td>FAA</td>
<td>Federal Aviation Administration</td>
<td>(866) 835-5322</td>
<td><a href="http://www.faa.gov">www.faa.gov</a></td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
<td>(888) 463-6332</td>
<td><a href="http://www.fda.gov">www.fda.gov</a></td>
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<tr>
<td>GSA</td>
<td>General Services Administration</td>
<td>(800) 488-3111</td>
<td><a href="http://www.gsa.gov">www.gsa.gov</a></td>
</tr>
<tr>
<td>LBL</td>
<td>Lawrence Berkeley National Laboratory</td>
<td>(510) 486-4000</td>
<td><a href="http://www.lbl.gov">www.lbl.gov</a></td>
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<tr>
<td>NCHRP</td>
<td>National Cooperative Highway Research Program</td>
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<td>(See TRB)</td>
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<tr>
<td>NIST</td>
<td>National Institute of Standards and Technology</td>
<td>(301) 975-6478</td>
<td><a href="http://www.nist.gov">www.nist.gov</a></td>
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<tr>
<td>PBS</td>
<td>Public Buildings Service</td>
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<td>(See GSA)</td>
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<tr>
<td>RUS</td>
<td>Rural Utilities Service</td>
<td>(202) 720-9540</td>
<td>(See USDA)</td>
</tr>
<tr>
<td>SD</td>
<td>State Department</td>
<td>(202) 647-4000</td>
<td><a href="http://www.state.gov">www.state.gov</a></td>
</tr>
<tr>
<td>TRB</td>
<td>Transportation Research Board</td>
<td>(202) 334-2934</td>
<td><a href="http://gulliver.trb.org">http://gulliver.trb.org</a></td>
</tr>
<tr>
<td>USDA</td>
<td>Department of Agriculture</td>
<td>(202) 720-2791</td>
<td><a href="http://www.usda.gov">www.usda.gov</a></td>
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<tr>
<td>USP</td>
<td>U.S. Pharmacopeia</td>
<td>(800) 227-8772</td>
<td><a href="http://www.usp.org">www.usp.org</a></td>
</tr>
<tr>
<td>USPS</td>
<td>Postal Service</td>
<td>(202) 268-2000</td>
<td><a href="http://www.usps.com">www.usps.com</a></td>
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</table>
D. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<td>ADAAG</td>
<td>Americans with Disabilities Act (ADA)</td>
<td>(800) 872-2253</td>
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<tr>
<td></td>
<td>Architectural Barriers Act (ABA)</td>
<td>(202) 272-0080</td>
</tr>
<tr>
<td></td>
<td>Accessibility Guidelines for Buildings and Facilities</td>
<td>Available from U.S. Access Board</td>
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<td><a href="http://www.access-board.gov">www.access-board.gov</a></td>
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<td><a href="http://www.gpoaccess.gov/cfr/index.html">www.gpoaccess.gov/cfr/index.html</a></td>
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<tr>
<td>DOD</td>
<td>Department of Defense Military Specifications and Standards</td>
<td>(215) 697-2664</td>
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<tr>
<td></td>
<td>Available from Department of Defense Single Stock Point</td>
<td><a href="http://dodssp.daps.dla.mil">http://dodssp.daps.dla.mil</a></td>
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<td>DSCC</td>
<td>Defense Supply Center Columbus</td>
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<td>FED-STD</td>
<td>Federal Standard</td>
<td>(See FS)</td>
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<td>FS</td>
<td>Federal Specification</td>
<td>(215) 697-2664</td>
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<td></td>
<td>Available from Department of Defense Single Stock Point</td>
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<td></td>
<td>Available from Defense Standardization Program</td>
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<tr>
<td></td>
<td>Available from General Services Administration</td>
<td>(202) 619-8925</td>
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<td></td>
<td><a href="http://www.gsa.gov">www.gsa.gov</a></td>
<td></td>
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<tr>
<td></td>
<td>Available from National Institute of Building Sciences</td>
<td>(202) 289-7800</td>
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<td></td>
<td><a href="http://www.wbdg.org/ccb">www.wbdg.org/ccb</a></td>
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<tr>
<td>FTMS</td>
<td>Federal Test Method Standard</td>
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<td>MIL</td>
<td>(See MILSPEC)</td>
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<tr>
<td>MIL-STD</td>
<td>(See MILSPEC)</td>
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<tr>
<td>MILSPEC</td>
<td>Military Specification and Standards</td>
<td>(215) 697-2664</td>
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<tr>
<td></td>
<td>Available from Department of Defense Single Stock Point</td>
<td><a href="http://dodssp.daps.dla.mil">http://dodssp.daps.dla.mil</a></td>
</tr>
<tr>
<td>UFAS</td>
<td>Uniform Federal Accessibility Standards</td>
<td>(800) 872-2253</td>
</tr>
<tr>
<td></td>
<td>Available from Access Board</td>
<td>(202) 272-0080</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.access-board.gov">www.access-board.gov</a></td>
<td></td>
</tr>
</tbody>
</table>
E. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation
www.dca.ca.gov/bhfti
(800) 952-5210
(916) 574-2041

CCR California Code of Regulations
www.calregs.com
(916) 323-6815

CDHS California Department of Health Services
www.dhcs.ca.gov
(916) 445-4171

CDPH California Department of Public Health, Indoor Air Quality Section
www.cal-iaq.org

CPUC California Public Utilities Commission
www.cpuc.ca.gov
(415) 703-2782

TFS Texas Forest Service
Forest Resource Development
http://txforestservation.tamu.edu
(979) 458-6606

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00
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.
B. Related Requirements:
   1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

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 to use temporary services and facilities without cost, including, but not limited to, Owner’s construction forces, Architect, occupants of Project, 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. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
3. 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.

C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
5. Other dust-control measures.

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.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board’s ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

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, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing with wind screen; minimum 8 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts; provide sandbags as required for support.

B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

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 01 77 00 "Closeout Procedures".

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
   1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."

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.
3.2 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 private system indicated 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. 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.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
   1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

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.
   2. Install lighting for Project identification sign.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
   1. Provide additional telephone lines for the following:
      a. Provide a dedicated telephone line for each facsimile machine in each field office.
   2. At each telephone, post a list of important telephone numbers.
      a. Police and fire departments.
      b. Ambulance service.
      c. Contractor's home office.
d. Contractor’s emergency after-hours telephone number.
e. Architect’s office.
f. Engineers’ offices.
g. Owner’s office.
h. Principal subcontractors’ field and home offices.

3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 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 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. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.

2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner’s existing parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.

   a. Location on Campus to be determined by Owner.

2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

   a. Provide temporary, directional signs for construction personnel and visitors.
3. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 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.

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.
   1. Comply with work restrictions specified in Section 01 10 00 "Summary."

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. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. 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 environmentally safe materials.

F. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

G. 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 work day.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
J. 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.

K. 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.
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.

3.5 MOISTURE AND MOLD CONTROL


B. Exposed Construction Phase: 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 Phase: 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, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: 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 permanent HVAC system to control humidity.
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.
   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 materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 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. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

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

E. 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. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00
SECTION 01 60 00 - PRODUCT REQUIREMENTS

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 selection of products for use in Project; product delivery, storage, and handling; manufacturers’ standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 23 00 "Alternates" for products selected under an alternate.
2. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
3. Section 01 42 00 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term “product” includes the terms “material,” “equipment,” “system,” and terms of similar intent.

1. Named Products: Items identified by manufacturer’s product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

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

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

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

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

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

C. Storage:

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

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

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 “Closeout Procedures.”

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.


6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

3. Products:
   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:
   a. Restricted List: Where Specifications include a list of manufacturers’ names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
2.2 COMPARABLE PRODUCTS

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

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

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00
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:

2. Installation of the Work.
3. Cutting and patching.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 02 41 19 "Selective Structure 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 other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

3. Products: List products to be used for patching and firms or entities that will perform patching work.

4. Dates: Indicate when cutting and patching will be performed.

5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

   a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 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. Operational elements include the following:

   a. Primary operational systems and equipment.
   b. Fire separation assemblies.
   c. Air or smoke barriers.
   d. Fire-suppression systems.
   e. Mechanical systems piping and ducts.
   f. Control systems.
   g. Communication systems.
   h. Fire-detection and -alarm systems.
   i. Conveying systems.
   j. Electrical wiring systems.
   k. 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. Other construction elements include but are not limited to the following:

   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

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. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

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

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. 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 01 31 00 “Project Management and Coordination.”

3.3 CONSTRUCTION LAYOUT

A. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

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: Do not use tools or equipment that produce harmful 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 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. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 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 01 10 00 “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 prevent 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.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 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.
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 01 50 00 "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 assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

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

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

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

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

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

END OF SECTION 01 73 00
SECTION 01 77 00 - 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 01 73 00 "Execution" for progress cleaning of Project site.
   2. Section 01 78 23 "Operation and Maintenance Data" for operation and
      maintenance manual requirements.
   3. Section 01 78 39 "Project Record Documents" for submitting record Drawings,
      record Specifications, and record Product Data.
   4. Section 01 79 00 "Demonstration and Training" for requirements for instructing
      Owner's personnel.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial 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, final completion construction photographic documentation, damage or settlement surveys, property surveys, 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 . Label with manufacturer's name and model number where applicable.
5. Submit test/adjust/balance 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. Submit demonstration and training video recordings specified in Section 01 79 00 “Demonstration and Training.”
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up 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 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 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 01 29 00 "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. Reinspection: 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, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

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

4. Submit list of incomplete items in the following format:
   a. MS Excel electronic file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

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

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
   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 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.
   4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
   1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
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 neither planted nor 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, elevator 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.

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 01 77 00
SECTION 01 78 23 - 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.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Section "General Commissioning Requirements" for verification and compilation of data into operation and 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. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.

b. Enable inserted reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority 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 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect’s and Commissioning Authority’s comments. Submit copies of each corrected manual within 15 days of receipt of Architect’s and Commissioning Authority’s comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

   1. List of documents.
   2. List of systems.
   3. List of equipment.
   4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. 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.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

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."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: 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 Construction Manager.
   7. Name and contact information for Architect.
   8. Name and contact information for Commissioning Authority.
   9. Names and contact information for major consultants to the Architect that
designed the systems contained in the manuals.
   10. 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. 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: Enable bookmarking of 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.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:
   1. Type of emergency.
   2. Emergency instructions.
   3. Emergency procedures.
B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
5. Power failure.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. 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.

B. 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.

C. 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.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

A. 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.

B. 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.

C. 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.

D. 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.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. 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.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. 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 warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in the 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.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
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.

D. 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.

E. 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.

F. 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.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. 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 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

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.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, 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.

1. 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.

F. 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 operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Section 01 78 39 "Project Record Documents."

G. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23
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 Specifications.
   3. Record Product Data.
   4. Miscellaneous record submittals.

B. Related Requirements:

   1. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
   2. Section 01 78 23 "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 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 PDF electronic files of scanned record prints and set(s) of prints.
         2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project’s Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. 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.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 ELECTRONIC CLOSEOUT DOCUMENTATION

A. GENERAL: Provide a complete project closeout documentation package in electronic format. This package shall include:

1. Issued for Construction: Plans & Specifications
2. Project Record Documents
3. APPROVED Submittals
4. Operation and Maintenance Manuals
5. Warranties
6. Owner Training Videos (.WMV or .MP4 Format)
7. Project Contract Directory

B. The Electronic Closeout Documentation shall be prepared by BHFX Imaging. **GCs / CMs are responsible for the Closeout Fee.** Please contact Sarah Jacobs at 847-593-3161 x. 206 or sarah.jacobs@bhfx.net for Pricing and Closeout Organization Information.

C. In order to facilitate the Electronic Closeout Documentation process, comply with the following procedures:

1. Contact BHFX Imaging for a Project Order Form a minimum of three (3) months prior to the Date of Substantial Completion to schedule a pre-closeout meeting.
   a. Review the following:
      1) Format of documents: PDF electronic format for all documents.
      2) Folder structure for storage and transfer of files.
      3) Schedule for collection and turn-over of closeout documentation.
      4) Record Document format procedures: Provide clean and accurate paper copies of the marked-up Record Documents (Drawings and Specifications) for scanning.
      5) Provide contact information for the individual responsible for the collection and transfer of the Electronic Closeout Documentation Package contents.
      6) Review a complete listing of Electronic Closeout Documentation Package contents.

2. Provide all documentation to BHFX Imaging for processing no later than 30 days after the date of Substantial Completion.

3. Schedule a training conference with the Owner’s Representative, Architect, Construction Manager and BHFX Imaging to present the completed Electronic Closeout Documentation Package.
PART 2 - PRODUCTS

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

3. Mark the Contract Drawings 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.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
   a. See Section 01 33 00 "Submittal Procedures" for requirements related to use of Architect's digital data files.
   b. Architect will provide data file layer information. Record markups in separate layers.

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

   1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

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

   1. Format: Annotated PDF electronic file with comment function enabled.
   2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
   3. Identification: As follows:
      a. Project name.
      b. Date.
      c. Designation "PROJECT RECORD DRAWINGS."
      d. Name of Contractor.

2.2 RECORD SPECIFICATIONS

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

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

B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

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

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

B. Format: Submit record Product Data as annotated PDF electronic file.
1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 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 PDF electronic file.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

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

END OF SECTION 01 78 39
SECTION 02 41 19 - 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 01 10 00 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 73 00 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach 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, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.
1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Use of elevator and stairs.
   5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

E. Predemolition Photographs or Video: Submit before Work begins.

F. 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.

G. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 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. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:
   a. Loose Furniture and Equipment
   b. Art Work and wall decor the Owner would like to salvage.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. 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.

E. Storage or sale of removed items or materials on-site is not permitted.

F. 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.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Owner to confirm if any existing warranties are applicable prior to construction commencement.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

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 ANSI/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. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

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

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

E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
   1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
   2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
   1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
   1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated 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. 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.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated 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.
   c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
   d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
   e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
   f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. 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.

   1. Comply with requirements for access and protection specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Facilities: 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. Cover and protect furniture, furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

C. Temporary Shoring: 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.
3.4 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. 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, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. 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 fire watch and portable fire-suppression devices during flame-cutting operations. 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. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. 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.
3.5 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, then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.6 DISPOSAL OF DEMOLISHED MATERIALS
A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   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. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
   4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 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 02 41 19
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. Decorative concrete masonry units.
   2. Clay face brick.
   3. Mortar and grout.
   4. Steel reinforcing bars.
   5. Masonry-joint reinforcement.
   6. Ties and anchors.
   7. Embedded flashing.
   8. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:
   1. Steel lintels in unit masonry.
   2. Steel shelf angles for supporting unit masonry.
   3. Cavity wall insulation.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:

1. Decorative CMUs, in the form of small-scale units.
2. Clay face brick, in the form of straps of five or more bricks.

1.6 INFORMATIONAL SUBMITTALS

A. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.

2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

B. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.

1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 36 inches high by full thickness.
2. Build sample panels facing south.
3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
4. Clean one-half of exposed faces of panels with masonry cleaner indicated.
5. Protect approved sample panels from the elements with weather-resistant membrane.
6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

1.8 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.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
   2. Where one wythe of multi wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. 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.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.


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 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 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 and will be within 20 feet vertically and horizontally of a walking surface.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.
2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.

1. Density Classification: Normal weight.
2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

C. Decorative CMUs: ASTM C 90.

1. Products: Subject to compliance with requirements, provide the following:
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
3. Density Classification: Normal weight.
4. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
5. Pattern and Texture: Match Existing Building.
7. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

2.5 MASONRY LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C 216.
   1. Products: Subject to compliance with requirements, provide the following:
      2. Grade: SW.
      3. Type: FBS.
      4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
      5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
      6. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet or shall have a history of successful use in Project's area.
      7. Size (Actual Dimensions): Match Existing Building.
      8. Application: Use where brick is exposed unless otherwise indicated.
      9. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.

2.7 MORTAR AND GROUT MATERIALS

A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

B. Masonry Cement: ASTM C 91/C 91M.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Holcim (US) Inc; Mortamix Masonry Cement.
      b. Lafarge North America Inc.; Magnolia Masonry Cement.
      c. Lehigh Hanson; HeidelbergCement Group; Lehigh Masonry Cement.

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.
   2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
   3. White-Mortar Aggregates: Natural white sand or crushed white stone.
   4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Corporation-Construction Systems.
   b. Euclid Chemical Company (The); an RPM company; Accelguard 80.

F. Water: Potable.

2.8 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
   b. Hohmann & Barnard, Inc; #RB or #RB-Twin Rebar Positioner.
   c. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Mill-galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
5. Wire Size for Veneer Ties: 0.187-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

E. Masonry-Joint Reinforcement for Multi wythe Masonry:

1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus one side rod at each wythe of masonry 4 inches wide or less.
2.9 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

2. Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

C. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

2. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.

3. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.

   a. Products: Subject to compliance with requirements, provide one of the following:

   1) Heckmann Building Products, Inc.; Pos-I-Tie.
   2) Hohmann & Barnard, Inc; 2-Seal Tie.
   3) Wire-Bond; SureTie.

2.10 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with Section 07 62 00 "Sheet Metal Flashing and Trim" and as follows:

   1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch thick.
   2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
   3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
   4. Solder metal items at corners.

B. Flexible Flashing: Use the following unless otherwise indicated:
1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, crosslaminated polyethylene film to produce an overall thickness of not less than 0.040 inch.

a. Products: Subject to compliance with requirements, provide one of the following:

   1) Advanced Building Products Inc.; Peel-N-Seal.
   2) Carlisle Coatings & Waterproofing Inc; CCW-705-TWF ThruWall Flashing.
   3) Grace Construction Products; W.R. Grace & Co. -- Conn.; PermA-Barrier Wall Flashing.
   4) Heckmann Building Products, Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
   5) Hohmann & Barnard, Inc; Sando-Seal.
   6) W.R. Meadows, Inc; Air-Shield Thru-Wall Flashing.

b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

C. Application: Unless otherwise indicated, use the following:

   1. Where flashing is indicated to receive counterflashing, use metal flashing.
   2. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or flexible flashing with a metal drip edge.
   3. Where flashing is fully concealed, use flexible flashing.

D. Solder and Sealants for Sheet Metal Flashings:

   1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
   2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

F. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch.

2.11 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 neoprene.
B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:
   1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer’s standard.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) Advanced Building Products Inc.; Mortar Maze Cell Vent.
         2) Heckmann Building Products, Inc.; No. 85 Cell Vent.
         3) Hohmann & Barnard, Inc; QV Quadro-Vent.
         4) Wire-Bond; Cell Vent.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Advanced Building Products Inc.; Mortar Break II.
      c. Hohmann & Barnard, Inc; Mortar Trap.
      d. Mortar Net USA, Ltd; Mortar Net.
      e. Wire-Bond; Cavity Net II.

2.12 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:
      b. EaCo Chem, Inc.
      c. PROSOCO, Inc.

2.13 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.

1. Do not use calcium chloride in mortar or grout.
2. Use masonry cement mortar unless otherwise indicated.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. 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.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
4. For interior nonload-bearing partitions, Type O may be used instead of Type N.

D. 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.
2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

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. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. 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.

E. 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.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to 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 or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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, or 1/2-inch 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, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch 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, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

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 bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. 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.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
   3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
   4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:
   1. Bed face shells in mortar and make head joints of depth equal to bed joints.
   2. Bed webs in mortar in all courses of piers, columns, and pilasters.
   3. Bed webs in mortar in grouted masonry, including starting course on footings.
   4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
   5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

E. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, or air barriers unless otherwise indicated.

3.6 ANCHORED MASONRY VENEERS
A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed tie sections in masonry joints.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

B. Provide not less than 2 inches of airspace between back of masonry veneer and face of insulation.

1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.7 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:

1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 07 92 00 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier, lapping at least 4 inches.
3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.

D. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

E. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.

3.11 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with...
specification requirements shall be done at Contractor's expense. B. Testing Prior to Construction: One set of tests.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.13 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 tooing 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 tooing 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. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. 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.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.14 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. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 31 20 00 “Earth Moving.”
3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner’s property.

END OF SECTION 04 20 00
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 non-load-bearing wall framing exceeding height limitations of standard, nonstructural metal framing.
2. Soffit framing.

B. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 09 22 16 "Non-Structural Metal Framing" for standard, interior non-loadbearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel framing.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.5 QUALITY ASSURANCE
A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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:
   2. MarinoWARE.
   3. MBA Building Supplies.
   4. Olmar Supply, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As indicated on Drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft.
      b. Ceiling Joist Framing: Vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.
   3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
   4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:

2. Wall Studs: AISI S211.
3. Headers: AISI S212.

D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL’s "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.3 COLD-FORMED STEEL FRAMING MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

1. Grade: As required by structural performance.
2. Coating: G60, A60, AZ50, or GF30 for interior framing.

B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G90.

2.4 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.

C. Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free
vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1 inch plus the design gap for one-story structures 1 inch plus twice the design gap for other applications.

2.5 SOFFIT FRAMING

A. Interior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0538 inch.

2.6 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
9. Joist hangers and end closures.

2.7 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, selftapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

E. Welding Electrodes: Comply with AWS standards.

2.8 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780/A 780M .

B. Cement Grout: Portland cement, ASTM C 150/C 150M, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30minute working time.

D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.9 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing 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. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: maximum 16 inches; As indicated on Drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Connect vertical deflection clips to studs and anchor to building structure.
3. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

1. Install solid blocking at centers indicated on Shop Drawings.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 ERECTION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

3.8 TESTING AND INSPECTION

A. Duties of the Testing and Inspection Agency:

1. Perform all testing and inspection required per approved testing and inspection program.

2. Furnish inspection reports to the Building Official, the Owner, the Architect, the Engineer of Record, and the General Contractor. The reports shall be completed and furnished within 48 hours of inspection work.

3. Submit a final signed report stating whether the work was, to the best of the Testing and Inspection Agency's knowledge, in conformance with the approved plans and specifications.

B. Testing and Inspection Schedule:

1. Material verification of structural steel, per IBC 1708.4.

   a. Identification markings to conform to ASTM standards specified in the approved construction documents: Periodic inspection, per ASTM A6 or ASTM A568.

   b. Manufacturer's certified mil test reports: Periodic inspection, per ASTM A6 or ASTM A568.

2. Material verification of weld filler materials, per AISC 360, section A3.5.

   a. Identification markings to conform to ASTM standards specified in the approved construction documents: Periodic inspection.

   b. Manufacturer's certificate of compliance required: Periodic inspection.

3. Inspection of welding:

   a. Welding of cold-formed structural steel framing: Periodic inspection, per AWS D1.3.

4. Inspection of steel frame joint details for compliance with approved construction documents, per IBC 1704.3.2:

   a. Details such as bracing and stiffening: Periodic inspection.

   b. Member locations: Periodic inspection.

   c. Application of joint details at each connection: Periodic inspection.

END OF SECTION 05 40 00
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 size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal 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 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

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 rule-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. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.

2.3 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 beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. 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.
4. 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.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
F. Application: Treat all miscellaneous carpentry unless otherwise indicated, including but not limited to the following:

1. Concealed blocking.
2. Plywood backing panels.

2.4 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: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. 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.

E. 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.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 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 of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Screws for Fastening to Metal Framing: ASTM C 1002 for non-load-bearing steel framing, and ASTM C 954 for cold-formed metal framing, length as recommended by screw manufacturer for material being fastened.

D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 as appropriate for the substrate.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

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 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. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

H. 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.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

2. ICC-ES evaluation report for fastener.

L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

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.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. 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 06 10 53
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. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 06 42 16 "Flush Wood Paneling."

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: For plastic-laminate-faced architectural cabinets.

1. Include plans, elevations, sections, and attachment details.
2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.

C. Samples for Verification: For the following:
1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
2. Thermoset Decorative Panels: 8 by 10 inches, for each color, pattern, and surface finish.
   a. Provide edge banding on one edge.
3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

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.
   B. Installer Qualifications: Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or 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 cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
   B. Field Measurements: Where cabinets 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.
      1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
   C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS
2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Grade: Premium.

C. Type of Construction: Frameless.

D. Door and Drawer-Front Style: Flush overlay.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

1. See "Millwork Finish Types" Legend on drawings for product information.

F. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade HGS.
4. Edge Treatment for Doors and Drawers: PVC T-mold matching laminate in color, pattern, and finish. If no matching T-mold is available, provide self edge with grade VGS laminate.
5. Pattern Direction: As indicated.

G. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
   a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
   b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
   c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials 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.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, 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 beyond the centerline of the burners at any time during the test.

1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

1. For panels 3/4 inch thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi; modulus of elasticity, 300,000 psi; internal bond, 80 psi; and screw-holding capacity on face and edge, 250 and 225 lbf, respectively.

2. For panels 13/16 to 1-1/4 inches thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi; modulus of elasticity, 250,000 psi; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf, respectively.

D. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.4 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.

C. Back-Mounted Pulls: BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

E. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

F. Drawer Slides: BHMA A156.9.

1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-overtravel-extension type; zinc-plated-steel ball-bearing slides.

2. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.

3. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.

4. For computer keyboard shelves, provide Grade 1HD-100.

5. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-200.

G. Slides for Sliding Glass Doors: BHMA A156.9, B07063; aluminum.

H. Door Locks: BHMA A156.11, E07121.

I. Drawer Locks: BHMA A156.11, E07041.

J. Door and Drawer Silencers: BHMA A156.16, L03011.
K. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.


L. For concealed hardware, provide manufacturer’s standard finish that complies with product class requirements in BHMA A156.9.

M. Wire Manager: Doug Mockett & Co., Inc.; WM22 J-Shape Wire Manager with flange.

2.5 SUPPORT BRACKETS

A. Surface-Mounted Brackets: Provide one of the following manufacturers, in bracket size recommended by manufacturer for depth of component to be supported, and in color indicated on Drawings:

1. A&M Hardware; Regular bracket.
2. Hafele; Work Surface bracket.
3. Federal Brace; Arrowhead Countertop bracket.

B. In-Wall (Concealed) Brackets: Provide one of the following manufacturers, in bracket size recommended by manufacturer for depth of component to be supported:

1. A&M Hardware; Concealed Work Station bracket.
2. Rangine Corp.; www.racks.com; EH series bracket, inside wall/flush mount configuration.

2.6 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.7 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, 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 architectural cabinet 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 hardware, appliances, 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.

D. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual."

   1. For glass in frames, secure glass with removable stops.
   2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

   A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

   A. Grade: Install cabinets to comply with quality standard grade of item to be installed.

   B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

   C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

   D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.

      1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
      2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
      3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.
3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 06 41 16
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 hollow-metal work.
   B. Related Requirements:
      1. Section 08 71 00 "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.

1.5 ACTION SUBMITTALS
   A. Product Data: For each type of product.
      1. Include construction details, material descriptions, core descriptions, fire-
         resistance ratings, temperature-rise 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 anchorages, joints, field splices, and connections.
      7. Details of accessories.
      8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work 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 fire-rated 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 work 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 work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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:

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. LaForce, Inc.
4. Philipp Manufacturing Co (The).
5. Premier Products, Inc.
7. Steelcraft; an Ingersoll-Rand company.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.
2.2 REGULATORY 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 and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the 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. Provide at all locations.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches
   c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
   d. Edge Construction: Model 1, Full Flush.
   e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
   b. Construction: Full profile welded.


2.4 FRAME ANCHORS

A. Jamb Anchors:
1. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z 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.

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. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

G. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.6 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:
1. **Steel-Stiffened Door Cores:** Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.

2. **Fire Door Cores:** As required to provide fire-protection and temperature-rise ratings indicated.

3. **Vertical Edges for Single-Acting Doors:** Provide beveled or square edges at manufacturer's discretion.

4. **Top Edge Closures:** Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.

5. **Bottom Edge Closures:** Close bottom edges of doors with end closures or channels of same material as face sheets.

6. **Exterior Doors:** Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

7. **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 beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. **Hollow-Metal Frames:** Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2. **Grout Guards:** Weld guards to frame at back of hardware mortises in frames to be grouted.

3. **Floor Anchors:** Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.

4. **Jamb Anchors:** Provide number and spacing of anchors as follows:

   a. **Masonry Type:** Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:

      1) Two anchors per jamb up to 60 inches high.
      2) Three anchors per jamb from 60 to 90 inches high.
      3) Four anchors per jamb from 90 to 120 inches high.
      4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

   b. **Stud-Wall Type:** Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

      1) Three anchors per jamb up to 60 inches high.
      2) Four anchors per jamb from 60 to 90 inches high.
      3) Five anchors per jamb from 90 to 96 inches high.
      4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
c. Compression Type: Not less than two anchors in each frame.
d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

5. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; 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 applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
   1. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
   2. Provide loose stops and moldings on inside of hollow-metal work.
   3. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.7 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.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.
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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer’s written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

   1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

      a. At fire-rated openings, install frames according to NFPA 80.

      b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

      c. Install frames with removable stops located on secure side of opening.

      d. Install door silencers in frames before grouting.

      e. Remove temporary braces necessary for installation only after frames have been properly set and secured.

      f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and 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.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

4. 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.

5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

   1. Non-Fire-Rated Steel Doors:

      a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.

      b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.

      c. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.

      d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

   2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

   3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. 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.
SECTION 08 14 16 - 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 08 80 00 "Glazing" for glass view panels in 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.
2. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.
1.4 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.

1.5 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 and relative humidity between 25 and 55 percent during remainder of construction period.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
2. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch 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: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Graham Wood Doors; an Assa Abloy Group 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."

   1. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.

B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.

C. WDMA I.S.1-A Performance Grade:

   1. Heavy Duty unless otherwise indicated.
   2. Extra Heavy Duty: Classrooms, public toilets, janitor's closets, assembly spaces, and exits.

D. 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. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
   3. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
   4. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
   5. Pairs without astragals: 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.

      a. Finish steel edges and astragals with baked enamels same color as doors.

E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

F. Particleboard-Core Doors:

   1. Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde.
   2. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
G. Structural-Composite-Lumber-Core Doors:

   a. Screw Withdrawal, Face: 700 lbf.
   b. Screw Withdrawal, Edge: 400 lbf.

H. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
   a. Screw-Holding Capability: Per WDMA T.M.-10 for performance grade indicated.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Custom (Grade A faces).
2. Species: White oak.
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 or more.
8. Transom Match: Continuous match.
9. Exposed Vertical and Top Edges: Applied wood edges of same species as faces and covering edges of crossbands - edge Type D.
11. Construction: Seven plies, either bonded or nonbonded construction.

2.4 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Recessed tapered beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

2.5 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.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. 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 08 80 00 "Glazing."

2.6 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: Custom.
2. Finish: WDMA TR-6 catalyzed polyurethane.
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 08 71 00 "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.
   2. Install smoke- and draft-control doors according to NFPA 105.

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 08 14 16
SECTION 08 41 13 - 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. Interior 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 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 Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.
1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.

1.6 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 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. 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, story drift, 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.

C. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. EFCO Corporation.
4. YKK AP America Inc.

B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 FRAMING

A. Design Parameters:

1. Interior Systems:
a. Profile: 1-3/4 inch by 4-1/2 inch system, center glazed.
b. Glazing System: Retained mechanically with gaskets on four sides.
c. Finish: Clear Anodic Finish, Class I or thicker.
d. Construction: Nonthermal.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

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. Materials:
   1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
      a. Sheet and Plate: ASTM B 209.
      b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
      c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
      d. Structural Profiles: ASTM B 308/B 308M.

2.4 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware is specified in Section 08 71 00 "Door Hardware."

2.5 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

D. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L.

2.6 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.
   3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.
B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch 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 complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 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 coped 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 for vision glass and exterior for spandrel glazing or metal panels.
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 screw-spline system.

F. 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.

G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
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 07 92 00 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 08 80 00 "Glazing."

F. Install weatherseal sealant according to Section 07 92 00 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
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; 1/4 inch in 40 feet.
2. **Level:** 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. **Alignment:**
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. **Location:** Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

END OF SECTION 08 41 13
SECTION 08 41 26 - ALL-GLASS 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. Interior swinging all-glass entrance doors.
      2. Interior all-glass storefronts.
   B. Related Requirements:
      1. Section 05 50 00 "Metal Fabrications" for overhead-steel support for all-glass systems.

1.3 PREINSTALLATION MEETINGS
   A. Preinstallation Conference: Conduct conference at Project site.

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 all-glass system.
   B. Shop Drawings: For all-glass entrances and storefronts.
      1. Include plans, elevations, and sections.
      2. Include details of fittings and glazing, including isometric drawings of patch fittings rail fittings.
      3. Door hardware locations, mounting heights, and installation requirements.
   C. Samples for Initial Selection: For each type of exposed finish indicated.
   D. Samples for Verification: For each type of exposed finish indicated, prepared on Samples of size indicated below.
      1. Metal Finishes: 6-inch- long sections of patch fittings and rail fittings, accessory fittings, and other items.
      2. Glass: 6 inches square, showing exposed-edge finish.
      3. Door Hardware: For exposed door hardware of each type, in specified finish, full size.
E. Delegated-Design Submittal: For all-glass systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 CLOSEOUT SUBMITTALS
A. Maintenance Data: For all-glass systems to include in maintenance manuals.

1.6 QUALITY ASSURANCE
A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY
A. Special Warranty: Manufacturer agrees to repair or replace components of all-glass systems 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 excessive deflection.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   c. Failure of operating components.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design all-glass entrances and storefronts.
B. General Performance: Comply with performance requirements specified, as determined by testing of all-glass entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
C. Structural Loads:
   1. Other Design Loads: As indicated on Drawings.
   2. Deflection Limits: Deflection normal to glazing plane is limited to 1/175 of clear span or 3/4 inch, whichever is smaller.

D. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1. Blumcraft of Pittsburgh; C.R. Laurence Co, Inc.
      2. Oldcastle BuildingEnvelope.
      3. Vitro America.

2.3 METAL COMPONENTS
   A. Fitting Configuration:
      1. Manual-Swinging, All-Glass Entrance Doors and: Patch fittings at head and sill on pivot side only.
      2. All-Glass Storefronts: Recessed glazing channel at top and continuous rail fitting at bottom.
   B. Patch Fittings: Stainless-steel-clad aluminum.
   C. Rail Fittings:
      2. Height:
         a. Top Rail: 3-1/2 inches.
         b. Bottom Rail: 3-1/2 inches.
      3. Profile: Square.
      4. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.
   D. Accessory Fittings: Match patch- and rail-fitting metal and finish for the following:
      1. Overhead doorstop.
      2. Center-housing lock.
      3. Glass-support-fin brackets.
   E. Anchors and Fastenings: Concealed.
   F. Materials:
1. Stainless-Steel Cladding: ASTM A 666, Type 304.
   a. Finish: No. 4 directional satin finish.

2.4 GLASS

A. Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), tested for surface and edge compression per ASTM C 1048 and for impact strength per 16 CFR 1201 for Category II materials.

1. Class 1: Clear monolithic.
   a. Thickness: 3/8 inch.
   b. Locations: As indicated.

2. Exposed Edges: Machine ground and flat polished.

2.5 ENTRANCE DOOR HARDWARE

A. General: Heavy-duty entrance door hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrance systems indicated. For exposed parts, match metal and finish of patch fittings and rail fittings.

B. Concealed Floor Closers and Top Pivots: Center hung; BHMA A156.4, Grade 1; including cases, bottom arms, top walking beam pivots, plates, and accessories required for complete installation.

   a. Positive Dead Stop: Coordinated with hold-open angle if any, or at angle selected.

3. Opening-Force Requirements:
   a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbfto set the door in motion and not more than 15 lbf to open the door to its minimum required width.
   b. Accessible Interior Swinging Doors: Not more than 5 lbf to fully open door.

C. Concealed Overhead Holder: BHMA A156.8, Grade 1, with dead-stop setting coordinated with concealed floor closer.

D. Push-Pull Set: As selected from manufacturer's full range.

E. Single-Door and Active-Leaf Locksets: Bottom-fitting or bottom-rail deadbolt.

1. Deadbolt operated by key outside and thumb turn inside.
F. Inactive-Leaf Locksets: Bottom-fitting or bottom-rail deadbolt.
   1. Deadbolt operated by key outside and thumb turn inside.

G. Cylinders: As specified in Section 08 71 00 "Door Hardware."

2.6 BUTT-GLAZING SEALANTS

A. Extruded Silicone Gasket: extruded silicone gasket designed to reduce sound, smoke, and odors through glass-to-glass (butt) joints.

2.7 FABRICATION

A. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.
   1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

B. Factory assemble components and factory install hardware and fittings to greatest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, 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 INSTALLATION

A. Install all-glass systems and associated components according to manufacturer's written instructions.

B. Set units level, plumb, and true to line, with uniform joints.

C. Maintain uniform clearances between adjacent components.

D. Lubricate hardware and other moving parts according to manufacturer's written instructions.

E. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.
3.3 ADJUSTING AND CLEANING

A. Adjust all-glass entrance doors and hardware to produce smooth operation and tight fit at contact points and weather stripping.

B. Remove excess sealant and glazing compounds and dirt from surfaces.

END OF SECTION 08 41 26
SECTION 08 80 00 - 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 doors, 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 square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturers of insulating-glass units with sputter-coated, low-E coatings.
B. Product Certificates: For glass.
C. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
D. Preconstruction adhesion and compatibility test report.
E. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
B. 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.
C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
   2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
   3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.
1.9 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.

1.10 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.

1.11 WARRANTY

A. 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. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in glass schedules or comparable product by one of the following:

1. Guardian Industries Corp.; SunGuard.
2. Oldcastle BuildingEnvelope?.
4. PPG Industries, Inc.
5. Trulite Glass & Aluminum Solutions, LLC.
6. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
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. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.

C. 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: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
3. 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, whichever is less.
4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. 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-glazing 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.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL’s WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing 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 or another certification agency acceptable to authorities having jurisdiction. 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.

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. 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.

2.5 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. Sealant shall have a VOC content of 250 g/L or less.

4. 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.
1. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation.
   b. GE Construction Sealants; Momentive Performance Materials Inc.
   d. Pecora Corporation.
   e. Sika Corporation.
   f. Tremco Incorporated.

2.6 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 804.3 tape, where indicated.
   2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   3. 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.

2.7 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.

2.8 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, ambient; 180 deg F, 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.
   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 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 GL-01: Clear fully tempered float glass.
   1. Minimum Thickness: 6 mm.
   2. Safety glazing required.

B. Glass Type GL-02: Clear fully tempered float glass.
   1. Minimum Thickness: 12 mm
   2. Safety glazing required.

C. Glass Type GL-05: One-way Visibility Glass fully tempered float glass.
   1. Minimum Thickness: 6 mm
   2. Safety glazing required.

END OF SECTION 08 80 00
SECTION 09 22 16 - 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 gypsum board partitions.
   2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
B. Related Requirements:
   1. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

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.

3. Steel Studs and Tracks:
   a. Minimum Base-Metal Thickness: 0.0329 inch.
      1) Gauge Equivalent framing must meet or exceed the minimum performance requirements of conventional framing as defined by ASTM and AISI.
   b. Depth: As indicated on Drawings.

B. Slip-Type Head Joints: Where indicated, provide the following:
   1. Double-Track System: ASTM C 645 top outer tracks, inside track with 3-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.

C. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: 0.0329 inch.

D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base-Metal Thickness: 0.0329 inch.
   2. Depth: As indicated on Drawings.

E. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.

F. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, 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-diameter wire, or double strand of 0.048-inch-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 or AC193 as appropriate for the substrate.
      a. Uses: Securing hangers to structure.
      b. Type: Torque-controlled, expansion anchor.
      c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch 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.

   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   b. Chicago Metallic Corporation; 640/660 Drywall Ceiling Suspension.
   c. United States Gypsum Company; Drywall Suspension System.

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:

   1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

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. Coordination with Sprayed Fire-Resistive Materials:

   1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
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.
   2. Tile Backing Panel Assemblies: Also comply with latest version of "TCNA Handbook for Ceramic, Glass, and Stone Tile 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 o.c. unless otherwise indicated on Drawings, or as required by referenced Installation standard.
   2. Multilayer Application: 16 inches o.c. unless otherwise indicated on Drawings, or as required by referenced Installation standard.
   3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated on Drawings, or as required by referenced Installation standard.

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. 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 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 o.c.

F. Z-Shaped Furring Members:
   1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
   2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
   3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch 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 o.c.
   2. Carrying Channels (Main Runners): 48 inches o.c.
   3. Furring Channels (Furring Members): 16 inches 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. Hangers may be attached to steel roof deck, with limitations or spacing and weight as indicated on Structural Drawings.

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. 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.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16
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. Tile backing panels.

B. Related Requirements:
   1. Section 09 22 16 "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. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. CertainTeed Corporation.
   b. Georgia-Pacific Building Products.
   c. National Gypsum Company.
   d. USG Corporation.

2. Thickness: 5/8 inch.

B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. CertainTeed Corporation.
   b. Georgia-Pacific Building Products.
   c. National Gypsum Company.
   d. USG Corporation.

2. Thickness: 1/2 inch.

C. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. CertainTeed Corporation.
   c. USG Corporation.

2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

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. Fry Reglet Corporation.
   b. Gordon, Inc.
   c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
3. Finish: Class II clear anodized finish.
2.6 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 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 drying-type, all-purpose compound.
   5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:
   1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Adhesives shall have a VOC content of 50 g/L or less.

C. 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 thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
E. 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.

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. Hilti, Inc.
   b. Pecora Corporation.
   c. Specified Technologies, Inc.
   d. USG Corporation.

2. Sealant shall have a VOC content of 250 g/L or less.

F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

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 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. 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- 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- 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. Type X: Vertical surfaces unless otherwise indicated.

2. Ceiling Type: Ceiling surfaces.

3. Mold-Resistant Type:

   a. Vertical surfaces with wall-mounted plumbing fixtures not scheduled to receive tile finish. Provide panels full height of wall from floor to ceiling and extend a minimum of 3 feet on each side from edge of plumbing fixture.

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 vertically (parallel 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. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

4. 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 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.

3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch 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 o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 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 all outside corners unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 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 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 4: At panel surfaces that will be exposed to view with gloss level 4 or lower paint finish, or where surface-applied product requires a level 4 finish.
   a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
4. Level 5: At panel surfaces that will be exposed to view with gloss level 5 or higher paint finish, or where surface-applied product requires a level 5 finish.
   a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 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 09 29 00
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. Resilient base (RB-x).
2. Resilient stair accessories (RST-x).
3. Resilient molding accessories (TRANS-x).

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 long.

1.4 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.  Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

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 or more than 90 deg F.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, 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 or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 RESILIENT BASE (RB-x)
A. See Legends on 'Finish Plan' drawings for product information.
B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
C. Thickness: 0.125 inch.
D. Height: As indicated on Drawings.
E. Lengths: Coils in manufacturer's standard length.
F. Outside Corners: Job formed.
G. Inside Corners: Job formed or preformed.
H. Colors: As selected from manufacturer's full range of colors.

2.3 RESILIENT STAIR ACCESSORIES (RST-x)
A. See Legends on 'Finish Plan' drawings for product information.

2.4 RESILIENT MOLDING ACCESSORY (TRANS-x)
A. See Legends on 'Finish Plan' drawings for product information.

2.5 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.

1. Adhesives shall have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.

C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.

D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread 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 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. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces 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 manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by 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 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

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 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.

E. 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. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:
   1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches 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 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 Stair Accessories:
   1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
   2. Tightly adhere to substrates throughout length of each piece.
   3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. 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. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.
   1. Apply number of coats recommended by manufacturer in writing.

E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 65 13
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. Luxury Vinyl Tile (LVT-x)

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.
   B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
      1. Show details of special patterns.

1.4 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

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. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE
   A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
1.7 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 or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time 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 or more than 95 deg F.

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 LUXURY VINYL TILE (LVT-x)

A. See Legends on ‘Finish Plan’ drawings for product information.

2.2 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.

1. Adhesives shall comply with the following limits for VOC content:
   a. Vinyl Composition and Quartz Tile Adhesives: 50 g/L or less.

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: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

   a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

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 they are the same temperature as the 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 in pattern indicated on drawings.

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.

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. Adhere floor tiles to flooring 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 exposed 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 Insert requirements number of coat(s) recommended by manufacturer.

E. Cover floor tile until Substantial Completion.
SECTION 09 68 13 - 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:
      1. Modular carpet tile (CPT-x).
      2. Walkoff Carpet (WLKF)

   B. Related Requirements:
      1. Section 09 65 13 "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. Shop Drawings: For carpet tile installation, plans showing the following:
      1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations
         where cutouts are required in carpet tiles.
      2. Carpet tile type, color, and dye lot.
      3. Type of subfloor.
      4. Type of installation.
      5. Pattern of installation.
      6. Pattern type, location, and direction.
      7. Type, color, and location of insets and borders.
      8. Type, color, and location of edge, transition, and other accessory strips.
      9. Transition details to other flooring materials.

   C. Samples for Verification: 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.
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.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI’s "CRI Carpet Installation Standard."

1.8 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.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.
1.9 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 WALKOFF CARPET (WLKF)

A. See Legends on 'Finsh Plan' drawings for product information.

2.2 CARPET TILE (CPT-x)

A. See Legends on 'Finish Plan' drawings for product information.

2.3 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.

1. Adhesives shall have a VOC content of 50 g/L or less.
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. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

   a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

   b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. 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 wide or wider, and protrusions more than 1/32 inch 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: 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. 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.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. 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.

G. 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 09 68 13
SECTION 09 72 00 - WALL COVERINGS

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. Vinyl wall covering (WC-x).

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product.
      1. Include data on physical characteristics, durability, fade resistance, and fire-test-
         response characteristics.
   B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern
      placement, seams and termination points.
   C. Samples: For each type of wall covering and for each color, pattern, texture, and finish
      specified, full width by minimum 36-inch-long in size.
      1. Wall-Covering Sample: From same production run to be used for the Work, with
         specified treatments applied. Show complete pattern repeat. Mark top and face
         of fabric.
   D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For wall coverings 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. Wall-Covering Materials: For each type, color, texture, and finish, full width by
         length to equal to 5 percent of amount installed.
1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

1. Wood-Veneer Wall Coverings: Condition spaces for not less than 48 hours before installation.

B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. 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 or less.

2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.2 WALL COVERING WITH CUSTOM GRAPHICS (WC-x)

A. WC-1:

1. Basis of Design: Wolf-Gordon
2. Product: Holborn
3. Color:

B. WC-2:

1. Basis of Design:
2. Product:
3. Color:
C. Description: Provide mildew-resistant products in rolls from same production run and complying with the following:
   1. FS CCC-W-408D and CFFA-W-101-D for Type III, Heavy-Duty products.

D. Total Weight: 13 ounces per yard, excluding coatings.

E. Width: 54 inches.


G. Colors, Textures, and Patterns: Custom printed graphic provided by Architect in .eps file format.

H. Tensile Strength: 92 x 92.

I. Tear Strength: 55 x 40.

J. Printing: Digitally printed 8 color solvent inks.

2.3 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
   1. Adhesive shall have a VOC content of 50 g/L or less.

B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

C. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
   1. Gypsum Board substrates must have a level 5 finish.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.
B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

   1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
   2. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
   3. Painted Surfaces: Treat areas susceptible to pigment bleeding.

D. Install two coats of water-based primer using a low nap roller. Wipe down wall surface with alcohol prior to application of wall covering.

E. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.

F. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

G. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

   A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

   B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.

   C. Install strips in same order as cut from roll.

      1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.

   D. Install wall covering without lifted or curling edges and without visible shrinkage.

   E. Match pattern 72 inches above the finish floor.

   F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.

   G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

   H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
3.4 CLEANING

A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00
SECTION 09 91 23 - INTERIOR PAINTING

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 surface preparation and the application of paint systems on interior substrates.

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. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   2. Indicate VOC content.
B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

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, 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. Paint: 5 percent, but not less than 1 gal. 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.

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.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. Glidden Professional.

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. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

D. Colors: As indicated in a color schedule.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

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. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
5. Gypsum Board: 12 percent.
6. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

G. 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 but not less than the following:
   1. SSPC-SP 3.

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.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:
   1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
   2. Sand surfaces that will be exposed to view, and dust off.
   3. Prime edges, ends, faces, undersides, and backsides of wood.
   4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

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 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.

2. 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. Water-Based Concrete Floor Sealer System MPI INT 3.2G:
      a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
      b. Topcoat: Sealer, water based, for concrete floors, MPI #99.

B. Gypsum Board Substrates:
   1. High-Performance Architectural Latex System MPI INT 9.2B:
      a. Prime Coat: Primer sealer, latex, interior, MPI #50.
      c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.

END OF SECTION 09 91 23
SECTION 10 11 00 - VISUAL DISPLAY UNITS

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. Visual display board assemblies (MB-x).
2. Curved Resinous Markerboards

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.

B. Shop Drawings: For visual display units.

1. Include plans, elevations, sections, details, and attachment to other work.
2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
3. Show locations and layout of special-purpose graphics.
4. Include sections of typical trim members.

C. Samples for Verification: For each type of visual display unit indicated.

1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch long sections of each trim profile.
3. Accessories: Full-size Sample of each type of accessory.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For visual display units to include in maintenance manuals.

1.5 QUALITY ASSURANCE
A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display units by field measurements before fabrication.
   1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.8 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Surfaces lose original writing and erasing qualities.
      b. Surfaces exhibit crazing, cracking, or flaking.
   2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain visual display units from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS
A. 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: 25 or less.
   2. Smoke-Developed Index: 50 or less.

2.3 VISUAL DISPLAY BOARD ASSEMBLY (MARKERBOARD, MB-X, where X is width in feet)
A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Bangor Cork Company, Inc.
   2. Best-Rite Manufacturing; a brand division of MooreCo, Inc.
   3. Claridge Products and Equipment, Inc.
   4. Egan Visual Inc.

B. Visual Display Board Assembly: factory fabricated.
   1. Assembly: markerboard.
   2. Corners: Square.
   3. Width: As indicated on Drawings.
   4. Height: As indicated on Drawings.
   5. Mounting Method: Direct to wall.

C. Markerboard Panel: Porcelain-enamel-faced markerboard panel on core indicated.

D. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; standard size and shape.
   1. Aluminum Finish: Clear anodic finish.

E. Joints: Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.

2.4 CURVED RESINOUS VISUAL DISPLAY BOARD (MARKERBOARD, where X is width in feet)
A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Deko Premier Markerboards

B. Visual Display Board Assembly: factory fabricated.
   1. Assembly: markerboard.
   2. Corners: Square.
   3. Size: As indicated on Drawings.
F. Markerboard Resinous Panel: Glass-free, magnetic, non-staining, resinous panel, factory finished edges, flexible, shatterproof and optically clear.

1. Color: Diamond

2.5 ACCESSORIES

A. Marker/Cloth Caddy: Provide one at each marker board:

2. Mount to wall surface with magnets where shown installed over magnetic markerboard wall covering, and with mechanical fasteners where shown installed over gypsum board.

2.6 MARKERBOARD PANELS

A. Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with high-gloss low-gloss finish as indicated. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

1. Face Sheet Thickness: 0.021 inch 0.013 inch uncoated base metal thickness.
2. Manufacturer's Standard Core: Minimum 1/4 inch thick, with manufacturer's standard moisture-barrier backing.
3. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

2.7 MATERIALS

A. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two or three-coat process.

B. Hardboard: ANSI A135.4, tempered.

C. Particleboard: ANSI A208.1, Grade M-1, made with binder containing no urea formaldehyde.

D. Medium-Density Fiberboard: ANSI A 208.2; made with binder containing no urea formaldehyde.

E. Fiberboard: ASTM C 208 cellulosic fiber insulating board.

F. Extruded Aluminum: ASTM B 221, Alloy 6063.

G. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

1. Adhesives shall have a VOC content of 50 g/L or less.
H. Primer/Sealer: Mildew-resistant primer/sealer complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by visual display unit manufacturer for intended substrate.

2.8 FINISH REQUIREMENTS

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 unacceptable. 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.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine walls and partitions for proper preparation and backing for visual display units.

C. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.

C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.
3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 CLEANING AND PROTECTION

A. Clean visual display units according to manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display units after installation and cleaning.

END OF SECTION 10 11 00
SECTION 10 22 39 - FOLDING PANEL PARTITIONS

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. Manually operated, acoustical panel partitions.

1.3 DEFINITIONS

A. NIC: Noise Isolation Class.
B. NRC: Noise Reduction Coefficient.
C. STC: Sound Transmission Class.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For operable panel partitions.
   1. Include plans, elevations, sections, attachment details, and numbered panel installation sequence.
   2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
C. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
   1. Include Samples of accessories involving color selection.
D. Samples for Verification: For each type of exposed material, finish, covering, or facing, prepared on Samples of size indicated below:
   1. Panel Facing Material: Manufacturer's standard-size unit, not less than 3 inches square.
E. Delegated-Design Submittal: For operable panel partitions.
   1. Include design calculations for seismic restraints that brace tracks to structure above.
1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Partition track, track supports and bracing, switches, turning space, and storage layout.
2. Suspended ceiling components.
3. Structural members to which suspension systems will be attached.
4. Size and location of initial access modules for acoustical tile.

B. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.

C. Field quality-control reports.

D. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.

1. In addition to items specified in "Operation and Maintenance Data," include the following:

a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.

b. Seals, hardware, track, track switches, carriers, and other operating components.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
Failures include, but are not limited to, the following:

a. Faulty operation of operable panel partitions.
b. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design seismic bracing of tracks to structure above.

B. Seismic Performance: Operable panel partitions shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.  
   1. The term "withstand" means "the partition panels will remain in place without separation of any parts when subjected to the seismic forces specified."

C. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
   1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E 90, determined by ASTM E 413, and rated for not less than the STC indicated.
   2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance according to ASTM C 423, and rated for not less than the NRC indicated.

D. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:

   1. 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: 450 or less.

   2. Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 OPERABLE ACOUSTICAL PANELS

A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
B. Basis-of-Design Product: Subject to compliance with requirements, provide Modernfold Inc.; Acousti-Seal Encore (Paired Panel) or comparable product by one of the following:
   a. Moderco Inc.
   b. Panelfold Inc.

C. Panel Operation: Manually operated, individual panels.

D. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.

E. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
   1. Panel Width: Equal widths.

E. STC: Not less than 54.

F. Panel Weight: 10 lb/sq. ft. maximum.

G. Panel Materials:
   1. Steel Frame: Steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.
   2. Steel Face/Liner Sheets: Tension-leveled steel sheet, manufacturer's standard minimum nominal thickness for uncoated steel.
   3. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use, corrosion resistance, and finish indicated; ASTM B 221 for extrusions; manufacturer's standard strengths and thicknesses for type of use.
      a. Frame Reinforcement: Manufacturer's standard steel or aluminum.
   4. Gypsum Board: ASTM C 1396/C 1396M.

H. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
   1. Hinges: Concealed (invisible).

I. Finish Facing: Vinyl

2.3 SEALS

A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:
1. Manufacturer's standard seals unless otherwise indicated.
2. Seals made from materials and in profiles that minimize sound leakage.
3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.

B. Horizontal Top Seals: Continuous-contact, resilient seal exerting uniform constant pressure on track or resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on track when extended.

C. Horizontal Bottom Seals: Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.

1. Mechanically Operated for Acoustical Panels: Extension and retraction of bottom seal by operating handle or built-in operating mechanism, with operating range not less than 2 inches between retracted seal and floor finish.

2.4 PANEL FINISH FACINGS

A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.

B. Vinyl

1. Color: To be Selected from Manufacturer’s Standard colors.

C. Trimless Edges: Fabricate exposed panel edges so finish facing wraps uninterrupted around panel, covering edge and resulting in an installed partition with facing visible on vertical panel edges, without trim, for minimal sightlines at panel-to-panel joints.

2.5 SUSPENSION SYSTEMS

A. Tracks: Steel or aluminum with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.

1. Panel Guide: Aluminum guide on both sides of the track to facilitate straightening of the panels; finished with factory-applied, decorative, protective finish.

B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
1. Multidirectional Carriers: Capable of negotiating intersections without track switches.

C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.

1. L Intersections: Allow panels to change 90 degrees in direction of travel.
2. T Intersections: Allow panels to pass through or change 90 degrees to another direction of travel.

D. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish unless otherwise indicated.

2.6 ACCESSORIES

A. Markerboard Trim Cap: Provide 1 inch markerboard trim cap along top and bottom edges of field-applied markerboard wall covering, both sides of panel. Wall covering will be applied edge-to-edge on all panels except storage pocket door.

B. Storage Pocket Door: Full height at end of partition runs to conceal stacked partition; of same materials, finish, construction, thickness, and acoustical qualities as panels; complete with operating hardware and acoustical seals at soffit, floor, and jambs. Hinges in finish to match other exposed hardware.

1. Manufacturer's standard method to secure storage pocket door in closed position.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.

B. Install panels in numbered sequence indicated on Shop Drawings.

C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.

E. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

3.3 ADJUSTING

A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust storage pocket doors to operate smoothly and easily, without binding or warping.

C. Verify that safety devices are properly functioning.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 10 22 39
SECTION 10 28 00 - 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.
   2. Childcare accessories.
   3. Prefabricated Lavatory Deck

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.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify accessories using designations indicated.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.
1.6 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.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

A. TA-1 - Toilet Paper Dispenser: Bobrick; B-4288.

B. TA-2 - Surface Mounted Sanitary Napkin Disposal; B-270

C. TA-3A, 3B, 4D - Grab Bars; B-6806

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

   a. Bobrick Washroom Equipment, Inc.

3. Material: Stainless steel, 0.05 inch thick.

   a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.

5. Configuration and Length: As indicated on Drawings.

D. TA-5A – Mirror Unit; B-1658

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

   a. Bobrick Washroom Equipment, Inc.

2. Frame: Stainless-steel angle, 0.05 inch thick.

   a. Corners: Manufacturer’s standard.

a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Size: As indicated on Drawings.

E. TA-6 – Wall Mounted Soap Dispenser; GOJO LTX-7 Dispenser.

F. TA-12 - Paper Towel Dispenser: Bobrick
   a. Mounting: Surface mounted.
   b. Minimum Capacity: 400 C-fold or 525 multifold towels.
   c. Material and Finish: Stainless steel, No. 4 finish (satin).
   d. Lockset: Tumbler type.
   e. Refill Indicators: Pierced slots at sides or front.

A. TA-13 - Sanitary Napkin Vending; Bobrick B37063C.

2.2 WARM-AIR DRYERS

A. Accessories:
   1. TA-9 Wall Mounted Automatic Hand Dryer; Bobrick B-7128.

2.3 CHILDCARE ACCESSORIES

A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.

B. Diaper-Changing Station TA-8: KB310-SSRE
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. Koala Kare Products.
   2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
      a. Engineered to support minimum of 250-lb static load when opened.
   4. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
   5. Liner Dispenser: Built in.

2.3 PREFABRICATED LAVATORY DECK
A. Single Source Product: Bradley Corp.; OmniDeck LD-3010 in TerreonRE, color to be selected from manufacturer's full range; with SL-TR1 undermount bowls, color Designer White; with standard stainless steel surface mount brackets.

1. Provide number of bowls as shown on drawings.
2. Provide with single station trap covers at each bowl.
3. Seam units that exceed 120 inches in total length.
4. Provide with 4 inch front apron.
5. Provide 2 inch back splash.
6. Provide 2 inch side splash on wall side.
7. Provide with strainers. Refer to Plumbing Drawings for associated faucet, drain, and trim.

2.4 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.


F. 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. G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 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, 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 10 28 00
SECTION 10 44 13 - 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 10 44 16 "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.

B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 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.

2.2 FIRE-PROTECTION CABINET (FEC)

A. Cabinet Type: Suitable for fire extinguisher.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Guardian Fire Equipment, Inc.
      b. JL Industries, Inc.; a division of the Activar Construction Products Group.
      c. Larsens Manufacturing Company.
      d. Potter Roemer LLC.

B. Cabinet Construction: Nonrated unless located in fire rated construction, then match rating of construction.
   1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Cold-rolled steel sheet.
   1. Shelf: Same metal and finish as cabinet.

D. Recessed Cabinet:
   1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

E. 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 backbend depth.

F. Cabinet Trim Material: Same material and finish as door.

G. Door Material: Steel sheet .

H. Door Style: Fully glazed panel with frame .

I. Door Glazing: Acrylic sheet .
   1. Acrylic Sheet Color: Clear transparent acrylic sheet.
J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide recessed door pull and friction latch.
   2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

K. 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. 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.
         2) Application Process: Decals.
         3) Lettering Color: Red.
         4) Orientation: Vertical.
      b. Confirm identification method above with Owner prior to applying decals. Delete cabinet door decals if wall-mounted signage will be provided by owner.

L. 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. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

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 thick.
2. 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 recessed and semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed and semirecessed 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.

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 suitable for wall thickness.

C. Identification: Apply decals at locations indicated.
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 10 44 13
SECTION 10 44 16 - 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 10 44 13 "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:
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 (FE)

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Guardian Fire Equipment, Inc.
   b. JL Industries, Inc.; a division of the Activar Construction Products Group.
   c. Larsens Manufacturing Company.
   d. Potter Roemer LLC.

2. Valves: Manufacturer's standard.

3. Handles and Levers: Manufacturer's standard.

4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized 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.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Guardian Fire Equipment, Inc.
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: 48 inches 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 10 44 16
SECTION 12 24 13 - ROLLER WINDOW SHADES

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. Manually operated roller shades with single rollers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

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. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.6 QUALITY ASSURANCE
A. Installer Qualifications: Fabricator of products.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS
A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS
A. Basis-of-Design Product: Subject to compliance with requirements, provide Draper, Inc.; Shearweave, or comparable product by one of the following:

   2. Lutron Electronics Co., Inc.
   3. MechoShade Systems, Inc.

B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

   1. Bead Chains: Manufacturer's standard.
      a. Loop Length: Full length of roller shade.
      b. Limit Stops: Provide upper and lower ball stops.
      c. Chain-Retainer Type: Chain tensioner, jamb mounted.
2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
   
a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.

C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   
   1. Roller Drive-End Location: Right side of interior face of shade.
   2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.

D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

F. Shadebands:
   
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
   
   a. Type: Enclosed in sealed pocket of shadeband material.

G. Installation Accessories:
   
   1. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
   
   1. Source: Roller shade manufacturer.
   3. Orientation on Shadeband: Up the bolt.
   4. Openness Factor: 3 percent.
   5. Color: To be selected from manufacturers full color line by Architect.
2.4 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
   1. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
   1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
   1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware. B. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION
A. Clean roller shade surfaces, after installation, according to manufacturer’s written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13
SECTION 12 36 23.13 - 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, including high-pressure decorative laminate and adhesive for bonding plastic 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 and other items installed in plastic-laminate countertops.

C. Samples for Verification:

   1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish.

1.4 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.

B. Installer Qualifications: Fabricator of products or Certified participant in AWI's Quality Certification Program.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 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.
1.6 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 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.

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. 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 HGP.

1. See "Millwork Finish Types" Legend on drawings for product information.

D. Edge Treatment: Provide the following where indicated on Drawings.

1. Post-formed edge; same as laminate cladding on horizontal surfaces.
2. 1 inch vinyl T-molding with flat face, color matched to laminate.
3. 3-mm PVC edging.

E. Core Material: Particleboard or medium-density fiberboard.

F. Core Material at Sinks: Particleboard made with exterior glue or medium-density fiberboard made with exterior glue.

G. Core Thickness: 3/4 inch.

1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
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.

2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying 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.

1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, 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 beyond the centerline of the burners at any time during the test.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
4. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
C. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

1. For panels 3/4 inch thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi; modulus of elasticity, 300,000 psi; internal bond, 80 psi; and screw-holding capacity on face and edge, 250 and 225 lbf, respectively.

2. For panels 13/16 to 1-1/4 inches thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi; modulus of elasticity, 250,000 psi; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf, respectively.

3. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

   a. Flakeboard Company Limited; Duraflake FR.
   b. SierraPine; Encore FR.

2.4 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2 1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:


2.5 MISCELLANEOUS MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

C. 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.

2.6 FABRICATION
A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch 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 of front and back edges and at intervals not exceeding 24 inches. 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.

E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

G. 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 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 12 36 23.13
SECTION 12 36 61.16 - SOLID SURFACING 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:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.
4. Solid surface material apron fronts.

1.3 ACTION SUBMITTALS

A. Product Data: For countertop materials.
B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.
C. Samples for Verification: For the following products:
   1. Countertop material, 6 inches square.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
B. Installer Qualifications: Fabricator of countertops.
1.6 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.7 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS (SS-x)

A. See Legends on "Finish Plan" drawings for product information.

B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

2.2 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Premium .

B. Configuration:

1. Front: Straight, slightly eased at top. Provide mitered top edge at front apron.
2. Backsplash: Straight, slightly eased at corner.

C. Countertops: 1/2-inch- thick, solid surface material .

D. Back and End splashes: 1/2-inch- thick, solid surface material .

E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.
2. Install integral sink bowls in countertops in the shop.

F. Joints: Fabricate countertops without joints.

G. Joints: Fabricate countertops in sections for joining in field.

1. Joint Locations for very large or complex countertops: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
H. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
   
   a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.


3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

   1. Adhesives shall have a VOC content of 70 g/L or less.

B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

2.4 ACCESSORIES

A. Grommets for Cable Passage through Countertops: See Section 12 36 23.13 "Plastic Laminate-Clad Countertops."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

H. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

END OF SECTION 12 36 61.16
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 pipe, fittings, valves, and connections for sprinkler systems.

1.3 REFERENCES

A. American Society of Mechanical Engineers:

2. ASME B16.3 - Malleable Iron Threaded Fittings.
3. ASME B16.4 - Gray Iron Threaded Fittings.
4. ASME B16.5 - Pipe Flanges and Flanged Fittings.

B. ASTM International:


C. National Fire Protection Association:


D. Underwriter Laboratories, Inc.:

1. UL 262 - Gate Valves for Fire-Protection Service.
2. UL 1887 - Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics.
1.4 SUBMITTALS

A. Shop Drawings: Provide a minimum 1/8"=1'-0" scale layout in all areas indicating sprinkler locations coordinated with ceiling installation. Indicate hydraulic calculations reference points, detailed pipe layout including pipe size, length, and elevation, hangers and supports, sprinklers, components and accessories. Indicate system control valve, drain valve, auxiliary drain valve, and inspector’s test locations. Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals and reference all required codes. Indicate support details, remote areas identified, sprinkler head summary and site plan of water main to street connection. Submit hydraulic calculations for each zone, occupancy type, hazard type, etc.

B. Product Data: Submit manufacturers catalog information. Indicate valve data and ratings.

C. Submit to Local School District authorities and School District’s insurance carrier required for permitting and approval.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include installation instructions and spare parts lists.

B. Project Record Documents: Provide updated version of minimum 1/8" = 1'-0" scale coordination shop drawings indicating actual locations of valves, piping above and below grade, sprinkler heads, auxiliary drains, fire department connections, inspector’s test connections, pumps, backflow preventers, and all other equipment installed by this contractor.

C. Instruct Owner’s representatives on locations and/or operation of control valves, low point drains and inspectors test valves.

1.6 QUALITY ASSURANCE

A. It shall be the responsibility of this Contractor to obtain approval from the governing authorities for the sprinkler system design and installation.

B. No changes shall be made to the aesthetic nature of the system design shown on the bidding documents without specific written authorization of the Architect. Notice of any proposed changes shall be made in writing on company letterhead to the Architect calling specific written attention to the Architect of the changes proposed. Mere submission of shop drawings showing proposed changes does not constitute said written notice. Approval of shop drawings by the Architect does not constitute approval of deviations not called to the attention of the Architect as noted herein.

C. Unauthorized changes installed at the project site shall be corrected per the design shown on the bidding documents at no cost to the Owner, and with no extension of contract completion time.

D. To assure uniformity and compatibility of piping in grooved piping systems, all grooved products utilized shall be supplied by a single manufacturer. Grooving tools shall be supplied from the same manufacturer as the grooved components.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

1.8 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter’s Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers, with labeling in place.
B. Furnish cast iron and steel valves with temporary protective coating.
C. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.

1.10 EXTRA MATERIALS

A. Division 01: Spare parts and maintenance products.

PART 2 - PRODUCTS

2.1 PIPING

A. (Pipe size 1" - 6") - Steel Pipe: ASTM A795; Schedule 40, black.
   2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings; or ASME B16.4, threaded fittings.
B. (Pipe size 1 1/4" - 6") - Steel Pipe: ASTM A795; Schedule 40, black.
1. Grooved End Fittings: ASTM A536 ductile iron or ASTM A53 steel fittings with grooved ends.

2. Mechanical Grooved Couplings: Ductile iron housing clamps to engage and lock, elastomeric sealing gasket, steel bolts, nuts, and washers.

C. (Pipe size 11/4 - 6") - Steel Pipe: ASTM A135; Schedule 10, black.

2. Grooved End Fittings: ASTM A536 ductile iron or ASTM A53 steel fittings with grooved ends.
3. Mechanical Grooved Couplings: Ductile iron housing clamps to engage and lock, elastomeric sealing gasket, steel bolts, nuts, and washers.

D. The use of CPVC plastic piping is not permissible for this project.

2.2 VALVES

A. Acceptable Manufacturers:

1. Victaulic.
2. Nibco.
5. Kennedy.
6. Febco.
7. Anvil.
8. Crane.

B. Furnish materials in accordance with UL 262 standard.

C. Gate Valves:

1. Up to and including 2 inches: Bronze body and trim, rising stem, hand wheel, solid wedge or disc, threaded ends.
2. Over 2 inches: Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, hand wheel, OS&Y, solid bronze or cast iron wedge, flanged or grooved ends.

D. Globe or Angle Valves:

1. Up to and including 2 inches: Bronze body, bronze trim, rising stem and hand wheel, inside screw, renewable rubber disc, threaded ends, with back seating capacity packable under pressure.
2. Over 2 inches: Iron body, bronze trim, rising stem, hand wheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.

E. Ball Valves:

1. Up to and including 2 inches: Bronze two piece body, brass, chrome plated bronze, or stainless steel ball, teflon seats and stuffing box ring, lever handle, threaded ends.

F. Butterfly Valves:
1. Bronze Body: Stainless steel disc, resilient replaceable seat, threaded or grooved ends, extended neck, hand wheel and gear drive and integral indicating device, and built-in tamper proof switch.
2. Cast or Ductile Iron Body: Cast or ductile iron, chrome or nickel plated ductile iron or aluminum bronze disc, resilient replaceable EPDM seat, wafer, lug, or grooved ends. With extended neck, hand wheel and gear drive and integral indicating device, and external tamper switch.

G. Check Valves:
1. Up to and including 2 inches: Bronze body and swing disc, rubber seat, threaded ends.
2. Over 2 inches: Iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends.
3. 4 inches and Over: Iron body, bronze disc with stainless steel spring, resilient seal, threaded, wafer, flanged or grooved ends.

H. Drain Valves:
1. Compression Stop: Bronze with hose thread nipple and cap.
2. Ball Valve: Brass with cap and chain, hose thread.

2.3 PIPE HANGERS AND SUPPORTS
A. Conform to NFPA 13.
B. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
C. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
E. Wall Support for All Pipe Sizes: Welded steel bracket and wrought steel clamp.
F. Vertical Support: Steel riser clamp.
G. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
H. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
I. All-threaded anchoring system designed for vertical attachment to metal decks or purlins shall not be permitted.

PART 3 - EXECUTION
3.1 PREPARATION
A. Ream pipe and tube ends. Remove burrs.
B. Remove scale and foreign material, from inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.
3.2 INSTALLATION

A. Install piping in accordance with NFPA 13 for sprinkler systems.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, to not interfere with use of space and other work.

D. Install piping in concealed spaces above finished ceilings.

E. Group piping whenever practical at common elevations.

F. Install pipe sleeve at piping penetrations through footings, partitions, walls, and floors. Seal pipe and sleeve penetrations to maintain fire resistance equivalent to fire separation.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

H. Pipe Hangers and Supports:
   1. Install in accordance with NFPA 13.
   2. Install hangers to with minimum 1/2 inch space between finished covering and adjacent work.
   3. Place hangers within 12 inches of each horizontal elbow.
   4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Where installing several pipes in parallel and at same elevation, provide multiple or trapeze hangers.
   7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
   8. Install copper plated hangers and supports for copper piping.

I. Where exposed, prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

J. Do not penetrate building structural members unless indicated.

K. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

L. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

M. Install valves with stems upright or horizontal, not inverted.

N. Install drain valves at main shut-off valves, low points of piping and apparatus. Coordinate location of drain valves and piping with Owner prior to installation.
O. Slope piping and arrange systems to drain at low points. Otherwise, provide auxiliary drains per NFPA 13 at trapped sections of pipe.

P. Work By Others: The installation of the automatic sprinklers necessitates the following work which will be furnished and installed by other trades.

1. All electrical wiring of the sprinkler alarm devices.
2. Water connection from water supply into the building terminating with a flanged outlet in a plum and level position. Flushing of underground main.
3. Any painting of sprinkler piping or equipment.
4. Furnish and install central station supervisory equipment required, including alarm panels, pull stations or automatic dialers.
5. Portable fire extinguishers if required.

Q. The sprinkler system must be in continuous operation. Contractor to coordinate system tie-in with Owner and Fire Department a minimum of 48 hours in advance.

R. Bushings will not be permitted for use in this installation.

S. All exposed pipe which passes through a wall or ceiling shall be equipped with an escutcheon plate.

T. All piping shall be installed in rust-free condition.

U. All piping and components necessary for installation may be prefabricated. However, the contractor must be willing to rework the prefabricated piping, fittings, and the like, as necessary to constitute a proper approved installation, jobsite conditions notwithstanding, at no additional cost to the owner.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Inserts:

1. Install inserts for placement in concrete forms.
2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Install hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

3.4 CLEANING

A. Division 01: Final cleaning.

B. Clean entire system after other construction is complete.

END OF SECTION 21 05 00
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:
   1. Wet pipe sprinkler system, system design, installation, and certification.

1.3 REFERENCES

A. National Fire Protection Association:
   2. FM - Factory Mutual Approval Guide.
   5. UL 199 - Automatic Sprinklers.

1.4 SYSTEM DESCRIPTION

A. System to provide coverage for building areas noted. Systems shall conform to the design criteria required by NFPA and the local authority having jurisdiction. Working plans and calculations shall be submitted to local approval agencies and to Owner’s fire protection consultant for approval.

B. Provide hydraulically designed system to NFPA 13 occupancy requirements.

C. Design shall be based on the flow test conducted at the jobsite, contractor shall perform new flow test with results to be within 12 months of permit drawings.

D. Hydraulic design of fire sprinkler piping shall be governed by Chapter 22 of NFPA 13.

E. Final hydraulic calculations are the sole responsibility of the Contractor. Any pipe sizing shown on the drawings reflect schematic design and are for the potential supposition purposes in the fire protection systems layout.

F. Interface system with building fire and smoke alarm system.

G. Provide fire department connections as indicated on Drawings.

1.5 SUBMITTALS

A. See Division 01 for project requirements.
B. Shop Drawings: Indicate layout of finished ceiling areas indicating sprinkler locations coordinated with ceiling installation. Indicate hydraulic calculations reference points, detailed pipe layout including pipe size, length, and elevation, hangers and supports, sprinklers, components and accessories. Indicate system control valve, drain valve, auxiliary drain valve, and inspector’s test locations.

C. Design Data: Submit design calculations of every occupancy type for each zone.

D. Product Data: Submit data on sprinklers and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, support requirements, and piping connections.

E. Prior to Submission to the architect/engineer submit shop drawings product data and hydraulic calculations to authority having jurisdiction Fire Marshall and Owner's insurance underwriter for approval. Submit proof of approval to Architect/Engineer.

1.6 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views of all backflow preventers, valves, air compressors, and all other equipment installed by this contractor.

C. Operation and Maintenance Data: Submit a copy of NFPA 25.

D. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with NFPA 13.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

1.9 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.

B. 2021 International Mechanical Code; as Amended by the City of Woodstock.

C. 2021 International Fire Code; as Amended by the City of Woodstock.


G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter’s Laboratories, Inc. as suitable for the purpose specified and indicated.

1.10 DELIVERY, STORAGE, AND HANDLING
A. See Division 01 for project requirements.
B. Store products in shipping containers until installation.
C. Furnish piping with temporary inlet and outlet caps until installation.

1.11 WARRANTY
A. See Division 01 for project requirements.
B. Submit manufacturer warranty and ensure forms have been completed in Owner’s name and registered with manufacturer.

1.12 EXTRA MATERIALS
A. See Division 01 for project requirements.
B. Furnish extra sprinklers under provisions of NFPA 13.
C. Furnish suitable wrenches for each sprinkler type.
D. Furnish a 12 sprinkler metal storage cabinet in sprinkler water service room.

1.13 OPERATION AND MAINTENANCE
A. Owner’s representative shall be instructed as to the location and operation of all control and drain valves, locations of low point drains and inspector’s test locations, and proper procedures to take sprinkler system in and out of service.

PART 2 - PRODUCTS

2.1 SPRINKLERS
A. Manufacturers:
   1. Viking.
   2. Tyco.
   3. Reliable.
   4. Victaulic.
   5. Grinnell.

B. Suspended Ceiling Type:
1. Type: Concealed pendant type with matching escutcheon plate.
2. Finish: per drawings.
3. Escutcheon Plate Finish: per drawings.
4. Custom Finish: Custom color as noted on Fire Protection and Architectural drawings. Locations shall be coordinated and verified with drawings.
5. Fusible Link: Fusible solder link type or glass bulb type. Temperature rated for specific area hazard.

C. Exposed Area Type:
1. Type: Standard upright type.
2. Finish: Brass.
3. Fusible Link: Fusible-solder link type or glass bulb type. Temperature rated for specific area hazard.

D. The use of flexible sprinkler drops is not permissible for this project.

E. Sprinklers subject to mechanical injury shall be protected with listed enameled guards. Sprinkler guards shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer. Refer to drawings for locations.

2.2 PIPING SPECIALTIES

A. Supervisory Switches: Provide on all control valves.

B. Inspector’s Test Connection
1. The automatic sprinkler system shall be equipped with a one (1) inch Inspector’s test connection, piped and arranged according to the applicable standards of NFPA 13. Pipe and fittings exposed to the atmosphere shall be galvanized.

C. Sprinkler Head Cabinet:
1. Furnish and install a spare head cabinet for emergency use. Cabinet shall have a capacity of twelve (12) sprinkler heads. Cabinet shall be equipped with twelve (12) sprinklers of assorted types and temperatures used throughout the building and shall in addition contain sprinkler head wrench.
2. Minimum of two (2) of each type shall be stocked in spare head cabinet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with NFPA 13.

B. Install equipment in accordance with manufacturer’s instructions.

C. Coordinate locations of equipment and piping with all other trades prior to installation.

D. Center sprinklers in two directions in ceiling tile or at quarter point in 2 x 4 tiles and provide piping offsets as required.
E. Install head guards on all sprinklers below 7'-0" or in mechanical rooms, storage room,
  gymnasiums or in rooms subject to mechanical injury or where indicated on drawings.

F. Provide additional sprinklers heads above and below mechanical/electrical ducts and
  equipment which exceeds 48 inches in width.

G. Provide additional sprinklers as required by applicable NFPA 13 sections as required
  above independent architectural suspended ceilings and architectural cloud ceilings.

H. Hydrostatically and Pneumatically test entire system per NFPA 13 and NFPA 25. Submit
  copy of tests to Owner and Engineer at completion of project.

I. Require test be witnessed by authority having jurisdiction. Submit test papers to
  engineer.

J. The automatic sprinkler contractor shall be responsible during the installation and testing
  periods of his work, for any damage to the work of the owner or others, and to the
  property and materials of the owner or others, caused by leaks in sprinkler equipment,
  fittings, or by disconnected pipes.

K. Each inspection test connection, main drain test connection, and auxiliary drain valve
  shall have an attached metallic or laminated three-layered plastic tag. Permanent marker
  shall not be an acceptable means of identification.

L. Provide hydraulic design information for each wet and dry zone in the fire protection
  system per NFPA 13. All design information shall be engraved on a metal or three-
  layered plastic sign. Permanent marker shall not be an acceptable means of
  identification.

M. The plan drawings which accompany the written bid specifications shall be included as
  part of the specifications. The plans represent minimum requirements and are not
  intended to limit the Contractor's responsibility under his contract.

N. The Contractor shall be responsible for the removal and re-installation of any existing
  ceiling tiles in clean condition. Any stained or damaged tiles are to be replaced by the
  Contractor at his expense.

O. Discharge from inspector's test pipes and auxiliary drains shall be at a location approved
  by the owner's representative.

P. Inspectors test drains and two inch main drains and dry pipe valve main drains shall be
  routed through exterior wall and drain to outside. Routing drains to interior floor drains,
  service sinks or mop basins shall not be permitted. Main drains shall not be routed
directly to any sanitary pump systems with a sealed basin. Drains may be routed to storm
  pump/basin systems at the same floor level of main drain only if this contractor has
  verified the pump system can safely accept the drain discharge rate and prevent flooding.

Q. The interconnection of the alarm supervisory signals must be approved by the proper
  alarm system representative, and working plans indicating the locations of all electrical
  components shall be furnished to the Fire Alarm Contractor.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Verify signal devices are installed and connected to fire alarm system.
3.3 CLEANING

A. See Division 01 for project requirements.

B. Flush entire piping system of foreign matter.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. See Division 01 for project requirements.

B. Apply masking tape or paper cover to protect concealed sprinklers, cover plates, and sprinkler escutcheons not receiving field paint finish. Remove after painting. Replace painted sprinklers with new.

END OF SECTION 21 13 00
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: Pipe and pipe fittings for the following systems:
1. Domestic water piping within 5 feet of building.
2. Sanitary sewer piping within 5 feet of building.
3. Equipment drains and over flows.
4. Unions and flanges.

B. Related sections:
1. Section 07 84 00 - Firestopping: Product requirements for firestopping for placement by this section.
2. Section 22 05 23 - General-Duty Valves for Plumbing Piping: Product requirements for valves for placement by this section.
3. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports [and firestopping] for placement by this section.
4. Section 22 07 00 - Plumbing Insulation: Product requirements for piping insulation for placement by this section.

1.3 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME B16.3 - Malleable Iron Threaded Fittings.
2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
3. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
4. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
5. ASME B31.9 - Building Services Piping.
6. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. ASTM International:

C. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

D. Cast Iron Soil Pipe Institute:

1.4 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit data on pipe materials and fittings. Submit manufacturers catalog information.

1.5 CLOSEOUT SUBMITTALS
A. Shop Drawings: Provide updated version of minimum 1/8" = 1'-0" scale coordination shop drawings indicating actual locations of valves, piping above and below grade, drains, wall hydrants, pumps, backflow preventers, clean outs, and all other equipment installed by this contractor.

1.6 QUALITY ASSURANCE
A. Perform Work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

1.7 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing work of this section with minimum three years experience, or approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install underground piping when bedding is wet or frozen.

1.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation of buried piping with trenching.
PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING, ABOVE GRADE

A. (Pipe size 3/4" - 6") - Copper Tubing: ASTM B88, Type L, hard drawn.
   2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, or braze, AWS A5.8 BCuP silver/phosphorus/copper alloy.

B. (Pipe size 3/4" - 4") - Copper Tubing: ASTM B88, Type L, hard drawn.
   1. Press Fittings: B16.22, wrought copper and bronze, with EPDM O-rings.
      a. Manufacturers:
         1) Viega.
         2) Nibco.
         3) Mueller PRS Streamline.

2.2 SANITARY SEWER AND VENT PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Soil Pipe: ASTM A74, service weight, bell and spigot ends.
   1. Fittings: Cast iron, ASTM A74.
   2. Joints: ASTM C564, rubber gasket joint devices or lead and oakum.

B. Plastic Pipe: ASTM D2665, polyvinyl chloride (PVC) material.

2.3 SANITARY SEWER AND VENT PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hub-less, service weight.
   1. Fittings: Cast iron, CISPI 301.

B. Copper Tube: ASTM B306, DWV.
   2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver.

C. PVC Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2665, PVC.
2.4 INDIRECT WASTE PIPING

A. Steel Pipe: ASTM A53 Schedule 40, galvanized.
   1. Fittings: ASME B16.3, malleable iron or ASME B16.4, cast iron.
   2. Joints: Threaded for pipe 2 inch and smaller; flanged for pipe 2-1/2 inches and larger.

B. Copper Tubing: ASTM B306, Type DWV, K, L, or M, hard drawn.
   2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver.

C. PVC Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2665, PVC.

2.5 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Ferrous Piping: Class 150, malleable iron, threaded.
   2. Copper Piping: Class 150, bronze unions with soldered joints.
   3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
   4. PVC Piping: PVC.

B. Flanges for Pipe 2-1/2 inches and Larger:
   1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
   2. Copper Piping: Class 150, slip-on bronze flanges.
   3. PVC Piping: PVC flanges.

C. Copper Press Connections:
   1. Manufacturers:
      a. Viega.
      b. Nibco.
      c. Mueller PRS Streamline.
   2. Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.

D. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify excavations are to required grade, dry, and not over-excavated.

C. Verify trenches are ready to receive piping.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system size, location, and invert are as indicated on Drawings.

B. Establish elevations of buried piping with not less than 5 ft of cover.

C. Establish a minimum separation of 18 inches vertical for 10 feet on either side of domestic water piping from sanitary sewer piping.

D. Excavate pipe trench in accordance with Section 31 23 17.

E. Install pipe to elevation as indicated on Drawings.

F. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

G. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 4 inches.

H. Install pipe on prepared bedding.

I. Route pipe in straight line.

J. Install pipe to allow for expansion and contraction without stressing pipe or joints.

K. Install shutoff and drain valves at locations indicated on Drawings in accordance with Section 22 05 23.

L. Pipe Cover and Backfilling:
   1. Backfill trench in accordance with Section 31 23 23.
2. Maintain optimum moisture content of fill material to attain required compaction density.
3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 6 inches minimum cover over top of jacket. Compact to 95 percent maximum density.
4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
5. Do not use wheeled or tracked vehicles for tamping.

M. Use ductile iron pipe through foundation wall penetrations where required by code.

N. PVC shall not be used for any sanitary drainage piping capable of receiving waste with a temperature exceeding 120 degrees. PVC serving floor drains in mechanical room with boiler or water heaters will not be accepted.

3.4 INSTALLATION - ABOVE GROUND PIPING

A. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

B. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

C. Group piping whenever practical at common elevations.

D. Sleeve pipe passing through partitions, walls and floors. Refer to Section 22 05 29.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 07 00.

G. Provide access where valves and fittings are not accessible.

H. Install non-conducting dielectric connections wherever jointing dissimilar metals.

I. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

J. Slope piping and arrange systems to drain at low points.

K. Install piping penetrating roofed areas to maintain integrity of roof assembly.

L. Install valves in accordance with Section 22 05 23.

M. Insulate piping. Refer to Section 22 07 00.

N. Install pipe identification in accordance with Section 22 05 53.

O. Sleeve pipes passing through partitions, walls and floors.

P. Pipe size shall be maintained full size up to the fixture connection.
Q. Contractor shall coordinate PVC piping installation with mechanical systems. PVC piping shall not be installed in plenum ceilings, provide metallic piping in plenum ceilings.

R. PVC Piping shall not be allowed above wood floors or in areas where impact damage can occur such as Gymnasiums.

S. PVC shall not be used for any sanitary drainage piping capable of receiving waste with a temperature exceeding 120 degrees. PVC serving floor drains in mechanical room with boiler or water heaters will not be accepted.

T. All piping, fittings and joints shall comply with the Local Amendments and the Authority having Jurisdiction. Materials listed in the specification that do not comply with these amendments shall not be used in the bidding process. It shall be the contractor's responsibility to verify these adopted amendments.

3.5 INSTALLATION - DOMESTIC WATER PIPING SYSTEMS

A. Install domestic water piping system in accordance with ASME B31.9.

B. Domestic water piping to be installed above ceiling unless otherwise noted on drawings.

C. Slope water piping minimum 0.25 percent and arrange to drain at low points.

D. Install unions downstream of valves at equipment or apparatus connections.

E. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

F. Provide flow controls in water recirculating systems where indicated.

G. Press Connections: Copper press fittings shall be made in accordance with the fittings and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.


3.6 INSTALLATION - SANITARY WASTE AND VENT PIPING SYSTEMS

A. Install sanitary waste and vent piping systems in accordance with ASME B31.9.

B. Install sanitary waste and vent piping systems in accordance with Section 22 13 00.

C. Install bell and spigot pipe with bell end upstream.

D. Provide acid resistant waste piping from laboratory sink to inlet of acid neutralizing basin.

E. Secure indirect waste piping over 5 feet in length to floor. See section 22 05 29.

3.7 INSTALLATION - STORM DRAINAGE PIPING SYSTEMS
A. Install storm drainage piping systems piping in accordance with ASME B31.9.
B. Install storm drainage piping systems in accordance with Section 22 14 00.
C. Install bell and spigot pipe with bell end upstream.

3.8 FIELD QUALITY CONTROL
A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
B. Test domestic water piping system in accordance with local authority having jurisdiction.
C. Test sanitary waste and vent piping system in accordance with local authority having jurisdiction.
D. Test storm drainage piping system in accordance with local authority having jurisdiction.

3.9 CLEANING
A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
B. Clean and disinfect domestic water distribution system in accordance with Section 22 11 00.

3.10 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM
A. Prior to starting work, verify system is complete, flushed and clean.
B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
E. Maintain disinfectant in system for 24 hours.
F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
H. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C651.
I. Follow all City and State requirements.
3.11 GENERAL

A. Before final acceptance of all piping systems, all systems must be tested in accordance with the schedule and prove to be free of leaks.

1. Perform tests under observation of Architect/Engineer.
2. Underground systems shall be tested prior to backfilling.
3. Remove, replace or satisfactorily repair defective work revealed by tests.
4. Make piping repairs with new materials; caulking of screwed joints or pin holes is not permitted.
5. Furnish all test equipment and materials for testing.
6. Owner to furnish water for testing and flushing.

3.12 TESTING MATERIAL

A. Testing Medium:

2. Pneumatic Testing Medium: Clean compressed air.

B. Pressure Testing Gauges: ANSI B40.1, Grade AA; minimum 6 inch diameter dial with scale divisions equal or less than maximum allowable pressure drop.

3.13 TESTING SYSTEMS

A. Waste and Vent System Piping:

1. Test with water or air before fixtures are set.
2. After plumbing fixtures have been set and traps filled with water, subject entire waste and vent systems to final test with smoke or peppermint.
3. Water Test:
   a. Apply to drainage and vent system in sections or in entirety dependent on size of system.
   b. When entire system is tested, tightly close all openings in pipes except highest opening and fill system with water to overflow point.
   c. When system is tested in sections, tightly plug each opening except highest opening, fill each section with water and test each section with minimum 10 foot head of water; test each preceding section until entire system has been tested with minimum 10 foot head of water, except uppermost 10 feet of system.
   d. Keep water in system or in portion under test, for minimum 30 minutes before inspection.
   e. System must be tight at all joints.

4. Air Test:
   a. When tests are made with air, apply minimum 5 psi with force pump and maintain 1 hour with no leakage apparent.
   b. Use mercury-column in making test.

B. Domestic Water System:

1. When rough-in is complete and before fixtures are set, test entire hot and cold water piping systems as scheduled and prove tight.
2. Where portion of water piping system is concealed before completion, test that portion separately as specified for entire system.

C. Hydrostatic and Pneumatic Testing Requirements:
1. Hydrostatic and pneumatic tests apply to piping indicated as scheduled in Paragraph D.
2. Pressure to be raised gradually to given value; then block off tight at source.
3. Allowable Pressure Drop: Maximum amount scheduled during corresponding minimum time interval.
   a. Visually examine all joints during test.
4. Upon successful completion and test approval, relieve piping of pressure, drain, put into normal operation except for potable water to be sterilized before placing in service.

D. Hydrostatic and Pneumatic Testing Schedule:
1. Service:
   a. Domestic Water: Potable Water
      1) Normal Work Pressure psig: 125
      2) Hydrostatic Test Pressure psig: 175
      3) Pneumatic Test Pressure psig: 2
      4) Maximum Allowable Pressure Drop psig: 2
      5) Minimum Test Time Hours: 2

3.14 CLEANING AND ADJUSTING

A. Cleaning: Thoroughly clean all parts of the piping installation at completion of work.
   1. Remove grease, metal cutting and sludge form all equipment, pipes, valves all fittings.
   2. Repair all stoppages, discoloration or other damage to finish, furnishings or parts of building that are due to Contractor’s failure to properly clean piping system.

B. Adjusting:
   1. Adjust flush valves and other parts of work for quiet operation.
   2. Adjust control devices for proper operation.
   3. Demonstrate to Architect/Engineer satisfactory operation following adjustment.
   4. Readjust or replace all items not functioning properly.

END OF SECTION 22 05 03
SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

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:
   1. Gate valves.
   2. Ball valves.
   3. Check valves.

B. Related Sections:
   1. Section 22 05 03 - Pipes and Tubes for Plumbing Piping and Equipment: Product and installation requirements for piping materials applying to various system types.
   2. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product and installation requirements for pipe hangers and supports.
   3. Section 22 07 00 - Plumbing Insulation: Product and installation requirements for insulation for valves.

1.3 REFERENCES

A. ASTM International:
   3. NSF/ANSI 61 - Drinking Water System Components

B. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
   2. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
   3. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturers catalog information with valve data and ratings for each service.
C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS
A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
B. Project Record Documents: Record actual locations of valves.
C. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views.

1.6 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 QUALITY ASSURANCE
A. Valves: Manufacturer's name and pressure rating marked on valve body.

1.8 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.
B. Installer: Company specializing in performing work of this section with minimum 3 years experience.

1.9 DELIVERY, STORAGE, AND HANDLING
A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install valves underground when bedding is wet or frozen.

1.11 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for extra materials.

PART 2 - PRODUCTS

2.1 GATE VALVES

A. 4 Inches and Larger:

1. Acceptable Manufacturers:
   
a. Apollo.
b. Jomar.
c. Kitz.
d. Milwaukee.
e. Nibco.
f. Stockham.
g. Watts.

2. MSS SP-128, Lead Free NSF-61 Certified, class 150, iron body, bronze trim, outside screw and yoke, handwheel, solid wedge disc, flanged ends.

2.2 BALL VALVES (3" AND SMALLER)

A. Press Connections:

1. Acceptable Manufacturers:

   a. Viega.
b. Nibco.

2. MSS SP 110, Lead Free NSF-61 Certified, 600 psi WOG, two piece silicon bronze body, stainless steel ball, full port, teflon seats and stuffing box ring, blow-out proof stem, press fitting ends, plastic lever handle.

B. Sweat Connections:

1. Acceptable Manufacturers:

   a. Apollo.
b. Jomar.
c. Kitz.
d. Milwaukee.
e. Nibco.
f. Stockham.
g. Watts.

2. MSS SP 110, Lead Free NSF-61 Certified, 600 psi WOG, two piece silicon bronze body, stainless steel ball, full port, teflon seats and stuffing box ring, blow-out proof stem, solder ends, lever handle.

2.3 CHECK VALVES

A. Acceptable Manufacturers:

1. Apollo.
2. Jomar.
5. Nibco.
7. Watts.

B. MSS SP-80, Lead Free NSF-61 Certified, class 125, bronze body and cap, bronze swing disc with rubber seat, solder ends.

2.4 CIRCUIT BALANCING VALVES

A. Acceptable Manufacturers:

1. Armstrong.
2. Bell & Gossett.
3. HCI.
4. Illinois.
5. Nibco.
6. Victaulic.
7. Watts.
8. Nexus.

B. Lead Free NSF-61 Certified.

C. Orifice principle by-pass circuit with direct reading gage, soldered or flanged piping connections for 125 psig (860kPa) working pressure, with shut off valves, and drain and vent connections.

D. Direct reading with insert Pitot tube, threaded coupling, for 150 psig working pressure, maximum 240 degrees F, 5 percent accuracy.

E. Calibrated, ball type balance valve with precision machined orifice, readout valves equipped with integral check valves and gasketed caps, calibrated nameplate and indicating pointer.

F. Provide manufacturer furnished molded insulated valves covers.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify piping system is ready for valve installation.

3.2 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install 3/4 inch gate valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

D. Install valves with clearance for installation of insulation and allowing access.

E. Provide access where valves and fittings are not accessible. Coordinate size and location of access doors with Section 08 31 13.

F. Refer to Section 22 07 00 for insulation requirements for valves.

3.3 VALVE APPLICATIONS

A. Install shutoff valves at locations indicated on Drawings in accordance with this Section.

B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

C. Install balancing trim package of a circuit balancing valve, check valve and ball valve in that order in direction of flow on each hot water recirculation line connection to the recirculation main.

D. Install ball valves for throttling, bypass, or manual flow control services.

E. Install spring loaded check valves on discharge of water pumps.

F. Install locking ball valves on all supply lines to emergency fixtures.

G. Install check valves on discharge of pumps in pumped sanitary and pumped storm water piping.

H. Install ball valves adjacent to equipment when functioning to isolate equipment.

I. Install ball and gate valves in domestic water systems for shut-off service.

J. Install gate valves for incoming domestic water service.

END OF SECTION 22 05 23
SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

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:
1. Pipe hangers and supports.
2. Hanger rods.
3. Inserts.
4. Flashing.
5. Sleeves.
6. Mechanical sleeve seals.
7. Formed steel channel.
8. Equipment bases and supports.

B. Related Sections:
1. Section 07 84 00 - Firestopping: Product requirements for firestopping for placement by this section.
2. Section 07 90 00 - Joint Protection: Product requirements for sealant materials for placement by this section.
3. Section 09 90 00 - Painting and Coating: Product and execution requirements for painting specified by this section.
4. Section 22 05 03 - Pipes and Tubes for Plumbing Piping and Equipment: Execution requirements for placement of hangers and supports specified by this section.
5. Section 22 11 00 - Facility Water Distribution: Execution requirements for placement of hangers and supports specified by this section.
6. Section 22 13 00 - Facility Sanitary Sewerage: Execution requirements for placement of hangers and supports specified by this section.
7. Section 22 14 00 - Facility Storm Drainage: Execution requirements for placement of hangers and supports specified by this section.

1.3 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME B31.1 - Power Piping.
2. ASME B31.5 - Refrigeration Piping.
3. ASME B31.9 - Building Services Piping.

B. ASTM International:

C. American Welding Society:
1. AWS D1.1 - Structural Welding Code - Steel.

D. FM Global:

E. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

F. Underwriters Laboratories Inc.:
3. UL 1479 - Fire Tests of Through-Penetration Firestops.
5. UL - Fire Resistance Directory.

G. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
2. Firestopping: Refer to section 07 84 13.

C. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

D. Manufacturer's Installation Instructions:
1. Hangers and Supports: Submit special procedures and assembly of components.
2. Firestopping: Refer to section 07 84 13.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
1.5 QUALITY ASSURANCE
A. Fire stopping: Refer to section 07 84 13
B. Perform Work in accordance with applicable authority for welding hanger and support attachments to building structure.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.
B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
B. Accept materials on site in original factory packaging, labeled with manufacturer’s identification.
C. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.8 ENVIRONMENTAL REQUIREMENTS
A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

1.9 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:

1. Anvil International.
2. B-Line.
3. Erico.
5. Uni-Strut.

B. Plumbing Piping - DWV:

1. Conform to ASME B31.9 and ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring or clevis hangers.
3. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels and hanger rods.
5. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Copper-plated, carbon-steel adjustable, ring.

C. Plumbing Piping - Water:

1. Conform to ASME B31.9 and ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring or clevis hangers.
3. Hangers for Cold Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 inches and Larger: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with hanger rods. Piping shall rest on sheet metal shield at each trapeze hanger with attachment to steel channel every 30 feet utilizing a strut mounted insulation coupling with strut clamp for use with copper piping with fiberglass insulation.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 inches and Larger: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
10. Wall Support for Hot Pipe Sizes 6 inches and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes 4 inches and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 inches and Larger: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Copper-plated, Carbon-steel ring.

2.2 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.

2.3 INSERTS

A. Manufacturers:
   1. Hilti.
   2. Liebig.
   3. Williams.

B. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.4 FLASHING

A. Metal Counterflushing: 22 gage thick galvanized steel.

B. Lead Flashing:
   1. Waterproofing: 5 lb./sq. ft sheet lead.
   2. Soundproofing: 1 lb./sq. ft sheet lead.

C. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.5 SLEEVES

A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Schedule 40 steel pipe sleeve

C. Fire stopping Insulation: Glass fiber type, non-combustible.

D. Sealant: UL rated, non-combustible flexible sealant with fire stop properties, ASTM E814.

2.6 MECHANICAL SLEEVE SEALS

A. Manufacturers:
   1. Flexicraft.
   2. Metraflex.
   3. Thunderline Link-Seal, Inc.
B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.7 FORMED STEEL CHANNEL

A. Manufacturers:
   1. Anvil International.
   2. B-Line.
   3. Erico.
   5. Uni-Strut.

B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify openings are ready to receive sleeves.

C. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Obtain permission from Architect/Engineer before using powder-actuated anchors.

B. Do not drill or cut structural members.

3.3 INSTALLATION - INSERTS

A. Install inserts for placement in concrete forms.

B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.4 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as scheduled.

B. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
C. Place hangers within 12 inches of each horizontal elbow.

D. Use hangers with 1-1/2 inch minimum vertical adjustment.

E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.

F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.

G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

H. Support riser piping independently of connected horizontal piping.

I. Provide copper plated hangers and supports for copper piping.

J. Design hangers for pipe movement without disengagement of supported pipe.

K. Prime coat exposed steel hangers and supports. Refer to Section 09 90 00. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

L. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.

M. Provide pipe hanger within 24" of elbow at roof drains.

3.5 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Provide housekeeping pads of concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Refer to Section 03 30 00.

B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.

C. Construct supports of formed steel channel. Brace and fasten with flanges bolted to structure.

3.6 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with mechanical sleeve seals.

B. Set sleeves in position in forms. Provide reinforcing around sleeves.

C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

D. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.

E. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fiberglass insulation and caulk airtight. If wall is fire rated, fill void between pipe or insulation and wall with firestopping compound per Section 078413. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

F. Install chrome plated steel or stainless steel escutcheons at finished surfaces.
3.7 INSTALLATION - FIRESTOPPING
A. Refer to section 07 84 13

3.8 CLEANING
A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
B. Clean adjacent surfaces of firestopping materials.

3.9 PROTECTION OF FINISHED WORK
A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
B. Protect adjacent surfaces from damage by material installation.

3.10 SCHEDULES

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>MAX. HANGER SPACING</th>
<th>HANGER ROD DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feet</td>
<td>Inches</td>
</tr>
<tr>
<td>Cast Iron (All sizes)</td>
<td>5</td>
<td>5/8</td>
</tr>
<tr>
<td>Cast Iron (All Sizes) with</td>
<td>10</td>
<td>5/8</td>
</tr>
<tr>
<td>10 foot length of pipe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper Tube, 1 inch and smaller</td>
<td>8</td>
<td>1/2</td>
</tr>
<tr>
<td>Copper Tube, 1 1/4 inch and larger</td>
<td>10</td>
<td>1/2</td>
</tr>
<tr>
<td>PVC (All Sizes)</td>
<td>4</td>
<td>3/8</td>
</tr>
</tbody>
</table>

END OF SECTION 22 05 29
SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

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:
   1. Nameplates.
   2. Tags.
   3. Pipe markers.

B. Related Sections:
   1. Section 09 90 00 - Painting and Coating: Execution requirements for painting specified by this section.

1.3 REFERENCES

A. American Society of Mechanical Engineers:

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit manufacturers catalog literature for each product required.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

C. Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer’s name and model number.

1.6 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.
1.7 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.8 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:
A. Kolbi.
B. Brady Corporation.
C. Seton.
D. Substitutions: Company Specializing in piping and equipment identification with minimum 5 years experience.

2.2 NAMEPLATES
A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.3 TAGS
A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

C. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame with clear plastic shield.

2.4 PIPE MARKERS


B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Identify water heaters, pumps, tanks, and water treatment devices with plastic nameplates. Identify in-line pumps and other small devices with tags.

F. Identify control panels and major control components outside panels with plastic nameplates.

G. Identify valves in main and branch piping with tags.

H. Identify piping, concealed or exposed, with plastic pipe markers. Identify service, flow direction. Install in clear view and align with axis of piping. Locate identification not to exceed 50 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

3.3 VALVE CHART AND SCHEDULE

A. Provide valve chart and schedule in aluminum frame with clear plastic shield. Install at location directed by Owner.

END OF SECTION 22 05 53
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:
   1. Piping system insulation.
   2. Pipe insulation jackets.
   3. Insulation accessories including vapor retarders and accessories.

B. Related Sections:
   1. Section 07 84 00 - Firestopping: Product requirements for firestopping for placement by this section.
   2. Section 09 90 00 - Painting and Coating: Execution requirements for painting insulation jackets and covering specified by this section.
   3. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product and Execution requirements for inserts at hanger locations.
   4. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for plumbing piping and equipment identification.

1.3 REFERENCES

A. ASTM International:

1.4 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.
C. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE
A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84 and NFPA 255.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
C. Protect insulation from weather and construction traffic, dirt, water, chemical, and physical damage, by storing in original wrapping.

1.8 ENVIRONMENTAL REQUIREMENTS
A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
B. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.
C. Maintain temperature during and after installation for minimum period of 24 hours.

1.9 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MAN MADE MINERAL FIBER (TYPE 'A')

A. Acceptable Manufacturers:
   1. Certainteed Corp.
   4. Owens Corning Fiberglass.

B. Insulation: ASTM C547 Mineral Fiber Pipe Insulation, Type I, 850 degrees F.
   1. 'K' Value: ASTM C335, 0.24 at 75 degrees F.
   2. Minimum Service Temperature: 0 degrees F.
   3. Maximum Service Temperature: 250 degrees F.
   4. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Retarder Jacket:
   1. ASTM C921, White Kraft paper with glass fiber yarn, bonded to aluminized film.
   2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.
   3. Secure with self sealing longitudinal laps and butt strips.
   4. Secure with outward clinch expanding staples and vapor barrier mastic.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive:
   1. Compatible with insulation.

F. Insulating Cement/Mastic:
   1. Acceptable Manufacturers:
2. **ASTM C195; hydraulic setting on mineral wool.**

G. Pipe insulation utilized to enclose PVC or other plastic piping within building plenum spaces shall comply with ASTM E84 flame spread and smoke developed requirements. Provide manufacturers certification that this product is approved to cover plastic piping in a plenum ceiling and meets the requirements for a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E 84 and UL 723 for installations on plastic piping in a plenum ceiling.

### 2.2 GLASS FIBER, FLEXIBLE OR SEMI-RIGID (TYPE 'B')

**A. Acceptable Manufacturers:**

1. Armstrong.
2. Certainteed Corp.
4. Knauf.
5. Owens Corning Fiberglass.

**B. Insulation:** ASTM C553; glass fiber, flexible or semi-rigid, noncombustible.

1. Thermal Conductivity: 0.24 at 75 degrees F.
2. Operating Temperature Range: 0 to 450 degrees F.
3. Density: 1.5 pound per cubic foot.

**C. Vapor Retarder Jacket:**

1. ASTM C921, White Kraft paper with glass fiber yarn, bonded to aluminized film.
2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.
3. Secure with self sealing longitudinal laps and butt strips.
4. Secure with outward clinch expanding staples and vapor barrier mastic.

**D. Tie Wire:** 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

**E. Vapor Barrier Lap Adhesive:**

1. Compatible with insulation.

**F. Insulating Cement/Mastic:**

1. **Acceptable Manufacturers:**

   a. Fibrex.
   b. Dabco.

2. **ASTM C195; hydraulic setting on mineral wool.**

### 2.3 PLENUM WRAP

**A. Acceptable Manufacturers:**

1. 3M Fire Barrier Plenum Wrap 5A.
2. Thermal Ceramics FireMaster PlenumWrap+.
3. Unifrax FyreWrap 0.5.

B. Plenum wrap shall be utilized to enclose PVC or other plastic piping/cabling within building plenum spaces which would not otherwise comply with ASTM E84 flame spread and smoke developed requirements. Fire resistant wrap shall consist of an inorganic blanket encapsulated with a scrim-reinforced foil. It shall provide a flexible, non-combustible enclosure for cables and pipe in return air plenums as tested to UL 910. It shall be a non-asbestos wrap containing a safer fiber construction and install easily due to high flexibility and strength. It shall be soluble in the lungs according to EU 67/548/EWG.

C. Physical and other characteristics:

1. 1/2 in. minimum thickness, 24"x50' or 48"x25', totally encapsulated with an aluminum foil scrim.
2. Weight: 0.46 lbs./sq. ft.
3. Maximum Flame Spread (Ft.) 0.01
4. Maximum Smoke (Optical Density) 0.01
5. Average Smoke (Optical Density) 0.00
6. Surface Burning Characteristics (ASTM E 84)
   a. Foil Encapsulated Blanket: Flame Spread: 0; Smoke Developed: 0
   b. Blanket: Flame Spread: 0; Smoke Developed: 0
8. Listed by Omega Point Laboratories Inc., Design Numbers: PP 100 F and PP 101 F

D. Installation materials

2. Carbon steel or stainless steel banding material, minimum 1/2" wide, minimum 0.015" thick, with steel banding clips.
3. 16 gauge steel tie wire as alternate for banding.

2.4 PIPE INSULATION AND EQUIPMENT JACKETS

A. PVC Plastic Pipe Jacket:

1. Product Description: ASTM D1784, One piece molded type fitting covers and sheet material, off-white color.
2. Thickness: 20 mil.

B. Lagging Adhesive:

1. Compatible with insulation.

C. Aluminum Pipe Jacket:

1. ASTM B209.
2. Thickness: 0.040 inch thick sheet.
5. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
6. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
B. Verify piping and equipment has been tested before applying insulation materials.
C. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION - PIPING SYSTEMS
A. Install materials in accordance with manufacturer's instructions.
B. Insulate all domestic water supply piping to the fixture connection.
C. Exposed Piping: Locate insulation and cover seams in least visible locations.
D. For insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory applied or field applied.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe.
   3. PVC fitting covers may be used.
   4. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
   5. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump body and expansion joints.
E. For insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with vapor barrier, factory applied or field applied.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
   3. Finish with glass cloth and adhesive.
   4. PVC fitting covers may be used.
   5. For hot piping water do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
F. Inserts and Shields:
   1. Application: Piping or Equipment 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under finish jacket.
   4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.
   5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.
G. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

H. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at bottom side of horizontal piping and sealed water tight.

I. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size insulation large enough to enclose pipe and heat tracer. Cover with [aluminum] [stainless steel] jacket with seams located at 3 or 9 o’clock position on side of horizontal piping with overlap facing down to shed water.

J. Plenum Wrap Installation:
   1. Cut Plenum Wrap to a length sufficient to wrap completely around the perimeter of the pipe, plus provide an overlap of not less than 1”. Plenum Wrap should be completely encapsulated with no exposed fiber. Aluminum foil tape shall be used to seal cut edges of the blanket.
   2. Temporarily secure Plenum Wrap in place using filament tape.
   3. Cut the next adjacent wrap of Plenum Wrap to completely wrap around the perimeter of the pipe with enough excess to provide an overlap of not less than 1”. A 1” longitudinal overlap is required onto the previous adjacent wrap.
   4. Install banding or tie wire around the Plenum Wrap to hold it in place. Place the bands or tie wires 1/4” from each edge of the blanket and at the midpoint of the blanket, 11-3/4” on center. Tension the banding or tie wire to hold the Plenum Wrap snugly in place, compressing the foil but not cutting the foil. Bands or wire may be hand tightened.

K. Finish insulation at supports, protrusions, and interruptions.

L. All fittings: Elbows, tees, valve bodies etc. shall be insulated with blanket insulation with equivalent thickness as the surrounding pipe and finished with PVC jackets.

M. Apply manufacturers recommended ultraviolet coating on all exterior cellular foam piping.

N. Where existing pipe insulation has been removed or disturbed due to new connections and/or alterations, repair and replace insulation using materials that match existing, except where existing insulation includes asbestos material.

O. All water supply piping shall be insulated throughout including piping installed in gypsum walls and chases and within open space of masonry plumbing chase.

P. All insulated piping exposed below ceilings in public areas shall be covered with PVC jacketing throughout. Areas shall include but not be limited to Kitchens, Toilet Rooms, Shower Rooms, Storage Rooms, Janitors Closets, Classrooms, Public Corridors, Office type areas.
3.3 **SCHEDULES**

<table>
<thead>
<tr>
<th>PIPING SYSTEMS</th>
<th>INSULATION TYPE</th>
<th>PIPE SIZE</th>
<th>THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Cold and Soft</td>
<td>A</td>
<td>Up to 2&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Cold Water Supply</td>
<td>A</td>
<td>2 1/2 to 6&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Domestic Hot Water Supply</td>
<td>A</td>
<td>Up to 1 1/4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Domestic Hot Water Supply</td>
<td>A</td>
<td>1 1/2&quot; and over</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>Domestic Hot Water Recirculation</td>
<td>A</td>
<td>Up to 1 1/4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Domestic Hot Water Recirculation</td>
<td>A</td>
<td>1 1/2&quot; and over</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>Domestic Tempered Water Supply</td>
<td>A</td>
<td>Up to 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Domestic Tempered Recirculation</td>
<td>A</td>
<td>Up to 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Sanitary Piping (PVC only) except when concealed in Masonry walls or chases.</td>
<td>A</td>
<td>Up to 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Horizontal Sanitary Piping Serving Electric Water Coolers or Cold Condensate Drainage</td>
<td>A</td>
<td>Up to 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Water Coolers</td>
<td>A</td>
<td>Up to 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Roof Drain Bodies</td>
<td>A</td>
<td>NA</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>Roof Drainage Horizontal (Cast Iron)</td>
<td>A</td>
<td>Up to 12&quot;</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>Roof Drainage Horizontal &amp; Vertical (PVC) except when concealed in masonry walls or chases.</td>
<td>A</td>
<td>Up to 12&quot;</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

**END OF SECTION 22 07 00**
SECTION 22 11 00 - FACILITY WATER DISTRIBUTION

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:

1. Pressure gages.
2. Test plugs.
3. Thermometers.
4. Strainers.
5. Hose bibs.
6. Hydrants.
8. Water hammer arresters.
10. Trap primers.
11. Expansion Tanks.
12. In-line circulator pumps.

B. Related Sections:

1. Section 07 84 00 - Firestopping: Product requirements for firestopping for placement by this section.
2. Section 08 31 13 - Access Doors and Frames: Product requirements for access doors for placement by this section.
3. Section 09 90 00 - Painting and Coating: Product and execution requirements for painting specified by this section.
4. Section 22 05 03 - Pipes and Tubes for Plumbing Piping and Equipment: Product and installation requirements for piping materials applying to various system types.
5. Section 22 05 23 - General-Duty Valves for Plumbing Piping: Product requirements for valves for placement by this section.
6. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports for placement by this section.
7. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification and valve tags for placement by this section.
8. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.

1.3 REFERENCES

A. American National Standards Institute:
2. ANSI/NSF 61 - Drinking Water System Components

B. American Society of Mechanical Engineers:
1. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
3. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

C. American Society of Sanitary Engineering:
1. ASSE 1010 - Performance Requirements for Water Hammer Arresters.
2. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers.
3. ASSE 1012 - Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent.
4. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
5. ASSE 1016 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.
6. ASSE 1017 - Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems.
7. ASSE 1019 - Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type.
8. ASSE 1069 - Performance Requirements for Automatic Temperature Control Mixing Valves.
9. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices.

D. ASTM International:

E. Plumbing and Drainage Institute:

F. Underwriters Laboratories Inc.:
1. UL 393 - Indicating Pressure Gauges for Fire-Protection Service.
2. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service.

1.4 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
1. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
2. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Submit installation instructions for pumps, valves and accessories.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS
A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
B. Project Record Documents: Record actual locations of valves and equipment.
C. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
B. Accept equipment on site in shipping containers with labeling in place. Inspect for damage.

1.8 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.

L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

1.10 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two loose keys for outside hose bibs.

PART 2 - PRODUCTS

2.1 PRESSURE GAGES

A. Gage: ASME B40.1, with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.

   1. Case: Steel.
   2. Bourdon Tube: Brass.
   3. Dial Size: 2-1/2 inch diameter.
   4. Mid-Scale Accuracy: Two percent.
   5. Scale: Psi.

2.2 TEST PLUGS

A. Test Plug: 1/4 inch or 1/2 inch brass or stainless steel fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F. Nordel core for temperatures up to 350 degrees F. Viton core for temperatures up to 400 degrees F.

2.3 STEM TYPE THERMOMETERS

A. Thermometer: ASTM E2251, red appearing non-mercury, lens front tube, cast aluminum case with enamel finish.

   1. Size: 9 inch scale.
   2. Window: Clear glass.
   4. Accuracy: ASTM E77 2 percent.
   5. Calibration: Degrees F.

2.4 STRAINERS

A. Acceptable Manufacturers:

   1. Ames.
   2. Apollo.
4. Febco.
5. Kitz.
7. Nibco.
8. Watts.
9. Wilkins.

B. 2 inch and Smaller: Lead Free NSF 61 Certified, Threaded brass body for 125 psi CWP, 
Y pattern with 1/32 inch stainless steel perforated screen, brass retainer cap and gasket.

C. 2-1/2 inch and Larger: Class 125, Lead Free NSF 61 Certified, flanged iron body with 
FDA epoxy coating, Y pattern with 1/16-inch stainless steel perforated screen.

2.5 WALL HYDRANTS

A. Refer to Plumbing Fixture Schedule on plumbing drawings.

2.6 BACKFLOW PREVENTERS (BFP)

A. Reduced Pressure Backflow Preventers (RPZ)

1. Acceptable Manufacturers:
   a. Watts Regulator.
   b. Ames.
   c. Apollo.
   d. Beeco.
   e. Febco Valves.
   f. Wilkins.

2. 2" and Smaller: ANSI/ASSE 1013; Lead Free NSF 61 Certified; bronze body with 
bronze internal parts and stainless steel springs; two independently operating, 
spring loaded check valves; diaphragm type differential pressure relief valve 
located between check valves; third check valve that opens under back pressure 
in case of diaphragm failure; non-threaded vent outlet; assembled with two ball 
valves, strainer, and four test cocks.

3. 2 1/2" and Larger: ANSI/ASSE 1013; Lead Free NSF 61 Certified, Epoxy coated 
ductile iron body with bronze internal parts and stainless steel springs; two 
independently operating, spring loaded check valves; diaphragm type differential 
pressure relief valve located between check valves; third check valve that opens 
under back pressure in case of diaphragm failure; non-threaded vent outlet; 
assembled with two OS&Ygate valves, strainer, and four test cocks.

4. Refer to Plumbing Fixture Schedule on plumbing drawings.

2.7 WATER HAMMER ARRESTERS

A. Manufacturers:

2. J.R. Smith.
5. Sioux Chief.
7. Zurn.

B. ASSE 1010; Lead Free NSF 61 Certified, copper construction, piston type sized in accordance with PDI WH-201.

C. Pre-charged suitable for operation in temperature range 34 to 250 degrees F and maximum 350 psi working pressure.

### 2.8 THERMOSTATIC MIXING VALVES

A. Thermostatic Mixing Valve (TMV-1) (Lavatory Point-of-Use):

1. Acceptable Manufacturers:
   
   a. Watts.
   b. Bradley.
   c. Lawler.
   d. Leonard.
   e. Powers.
   f. Symmons.

2. Valve: ASSE 1070; Lead Free NSF 61 Certified, cast brass body with rough bronze finish, locking temperature regulator, with integral check valves and inline screens on both inlets.

3. Refer to Plumbing Fixture Schedule on plumbing drawings.

### 2.9 TRAP PRIMERS

A. Acceptable Manufacturers:

1. Mifab, Model M500.
2. J.R. Smith.
4. Sioux Chief.
5. Wade.
7. Zurn.

B. Pressure drop activated, brass trap primer with replaceable filter screen.

### 2.10 EXPANSION TANKS

A. Acceptable Manufacturers:

1. Amtrol.
2. John Woods Co.
3. Watts.
4. Wessels.
5. John Woods Co.

B. Construction: Welded steel, tested and stamped in accordance with Section 8D of ASME Code; rated for working pressure of 150 psig, with heavy duty butyl bladder (FDA approved).
C. Accessories: Pressure gauge and air-charging fitting, tank drain; precharged.

D. Size: Refer to schedule on plumbing drawings.

2.11 IN-LINE CIRCULATOR PUMPS

A. Acceptable Manufacturers:
   1. Armstrong.
   2. Bell & Gossett.
   4. Taco.

B. Impeller: Bronze.

C. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.

D. Seal: Carbon rotating against a stationary ceramic seat.

E. Drive: Flexible coupling.

F. Control: Provide aquastat on pump return line downstream of pump, aquastat to be Honeywell Model L6006C or equivalent. Aquastat to be set to return water when temperature in recirculation loop drops to 129 Degrees F.

G. Capacity: Refer to drawings.

2.12 SYSTEM LUBRICATED CIRCULATORS

A. Acceptable Manufacturers:
   1. Armstrong.
   2. Bell & Gossett.
   4. Taco.

B. Type: Horizontal shaft, single stage, direct connected with multiple speed wet rotor motor for in-line mounting, for 140 psig maximum working pressure, 230 degrees F maximum water temperature.

C. Casing: Bronze with flanged pump connections.

D. Impeller: Polypropylene.

E. Shaft: Ceramic.

F. Rotor: Stainless Steel.

G. Bearings: Carbon, lubricated by the circulating fluid.

H. Motor: Impedance protected, single speed.

I. Capacity: Refer to drawings.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

3.2 INSTALLATION - METERS

A. Install positive displacement meters in accordance with AWWA M6, with isolating valves on inlet and outlet.
B. Install Work in accordance per Local Public Work's standards.

3.3 INSTALLATION - THERMOMETERS AND GAGES

A. Install in accordance with manufacturer's instructions.
B. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Ensure sockets allow clearance from insulation.
C. Provide pressure gages where indicated on plans. Select appropriate scale range for service involved.
D. Provide instruments with scale ranges selected according to service with largest appropriate scale.
E. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
F. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.
G. Locate test plugs adjacent thermometers and thermometer sockets and adjacent to pressure gages and pressure gage taps and as shown on drawings.
H. Install gage taps in piping.

3.4 INSTALLATION - ABOVE GROUND PIPING

A. Provide support for utility meters in accordance with requirements of utility companies.
B. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, irrigation systems, flush valves, interior and exterior hose bibs.
C. Install backflow preventers per manufacturers instructions.
D. Pipe relief from backflow preventer to nearest drain with air gap fitting. Discharge piping to be turned down into water receptor. Secure discharge piping to floor.
E. Install air chambers on hot and cold water supply and make-up water piping to each fixture or group of fixtures each washroom. Fabricate same size as supply pipe or 3/4 inch minimum, and minimum 18 inches long or provide water hammer arrestors as specified. Water hammer arrestors shall be installed in an accessible location for service and easy replacement. Locations, size and quantities shall be determined by contractor.

F. Contractor to obtain written documentation of any inspector requested changes to the plumbing design drawings and specifications. Plumbing engineer to review and approve changes prior to installation or executions of inspector requested changes.

3.5 INSTALLATION - DOMESTIC WATER PUMPS

A. Provide line sized isolating valve and strainer on suction and line sized soft seated check valve and balancing valve on discharge. (Refer to detail on drawings).

B. Support piping adjacent to pump such that no weight is carried on pump casings.

C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

D. Provide air cock and drain connection on horizontal pump casings.

E. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line sizes 4 inches and over.

F. Align and verify alignment of base mounted pumps prior to start-up.

G. Lubricate pumps before start-up.

3.6 INSTALLATION - EXPANSION TANKS

A. Install expansion tank on cold water discharge pipe from heater with no means of shut-off between heater and tank.

3.7 INSTALLATION - SERVICE CONNECTIONS

A. Provide new water service complete with approved reduced pressure zone back-flow preventer and water meter and strainer.

B. Provide sleeve in wall for service main and support at wall with reinforced-concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

END OF SECTION 22 11 00
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:
   1. Floor drains.
   2. Floor sinks.
   3. Cleanouts.
B. Related Sections:
   1. Section 07 84 00 - Firestopping: Product requirements for firestopping for placement by this section.
   2. Section 08 31 13 - Access Doors and Frames: Product requirements for access doors for placement by this section.
   3. Section 09 90 00 - Painting and Coating: Product and execution requirements for painting specified by this section.
   4. Section 22 05 03 - Pipes and Tubes for Plumbing Piping and Equipment: Product and installation requirements for piping materials applying to various system types.
   5. Section 22 05 23 - General-Duty Valves for Plumbing Piping: Product requirements for valves for placement by this section.
   6. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment: Product requirements for pipe hangers and supports [and firestopping] for placement by this section.
   7. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification for placement by this section.
   8. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.

1.3 REFERENCES
A. American Society of Mechanical Engineers:
   1. ASME A112.6.3 - Floor and Trench Drains.
   3. ASME B16.3 - Malleable Iron Threaded Fittings.
   4. AWWA C-110 - Gray Iron Threaded Fittings.
   5. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
   6. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
   7. ASME B31.9 - Building Services Piping.
1.4 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
B. Product Data:
   1. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

1.5 CLOSEOUT SUBMITTALS
A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
B. Project Record Documents: Record actual locations of equipment and clean-outs.
C. Operation and Maintenance Data: Submit frequency of treatment required for interceptors. Include, spare parts lists, exploded assembly views for pumps and equipment, operating manuals for all control panels, and service depot location and telephone number.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.7 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.
1.8 DELIVERY, STORAGE, AND HANDLING
A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
B. Accept specialties on site in original factory packaging. Inspect for damage.

1.9 WARRANTY
A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

1.10 EXTRA MATERIALS
A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 - PRODUCTS

2.1 FLOOR DRAINS
A. Floor Drain:
   1. Refer to Plumbing Fixture Schedule on plumbing drawings.

2.2 FLOOR SINKS
A. Refer to Plumbing Fixture Schedule on plumbing drawings.

2.3 CLEANOUTS
A. Floor Cleanout (FCO):
   1. Refer to Plumbing Fixture Schedule on plumbing drawings.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
B. Verify excavations are to required grade, dry, and not over-excavated.

3.2 INSTALLATION
A. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.
B. Encase exterior cleanouts in concrete flush with grade.
C. Install floor cleanouts at elevation to accommodate finished floor.
D. Install grease interceptors per manufacturers instructions.
E. Install solids interceptors with manufacturer's minimum required clearance for strainer removal.
F. Excavate and backfill in accordance with Division 02000 for work of this section.

G. Contractor to obtain written documentation of any inspector requested changes to the plumbing design drawings and specifications. Plumbing engineer to review and approve changes prior to installation or executions of inspector requested changes.

END OF SECTION 22 13 00
SECTION 22 34 00 - FUEL-FIRED DOMESTIC WATER HEATERS

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:
      1. Commercial gas fired storage tank water heaters.
   B. Related Sections:
      1. Section 03 30 00 - Cast-In-Place Concrete: Execution requirements for concrete housekeeping pads specified by this section.
      2. Section 22 07 00 - Plumbing Insulation: Field applied insulation for domestic water heaters.
      3. Section 22 11 00 - Facility Water Distribution: Supply connections to domestic water heaters.
      4. Section 23 11 23 - Facility Natural-Gas Piping: Execution requirements for gas piping connections specified by this section.
      5. Section 23 51 00 - Breechings, Chimneys, and Stacks: Execution requirements for breeching, chimney, and stack connections to water heaters specified in this section.
      6. Section 26 05 03 - Equipment Wiring Connections: Execution requirements for electric connections specified by this section.

1.3 REFERENCES
   A. American National Standards Institute:
      2. ANSI Z21.10.3 - Gas Water Heaters - Vol. III Storage, with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous Water Heaters.
      3. ANSI Z21.13 - Gas-Fired Low Pressure Steam and Hot Water Boilers
   B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   C. American Society of Mechanical Engineers:
      1. ASME PTC 25 - Pressure Relief Devices.
      2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
   D. National Fire Protection Association:

1.4 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
B. Product Data:
   1. Water Heaters: Submit dimensioned drawings of water heaters indicating components and connections to other equipment and piping. Indicate pump type, capacity and power requirements. Submit electrical characteristics and connection locations.
C. Manufacturer’s Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS
A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
B. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner’s name and registered with manufacturer.

1.6 QUALITY ASSURANCE
A. Conform to ASME Section VIII for construction of water heaters. Provide boilers registered with National Board of Boiler and Pressure Vessel Inspectors.
B. Water Heater Performance Requirements: Equipment efficiency not less than prescribed by ASHRAE 90.1 when tested in accordance with ANSI Z21.10.3.

1.7 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING
A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.
B. Accept water heaters on site in original labeled cartons. Inspect for damage.
C. Protect tanks with temporary inlet and outlet caps. Maintain caps in place until installation.

1.9 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.10 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
B. Furnish three year manufacturer warranty for domestic water heaters.

1.11 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 - PRODUCTS

2.1 COMMERCIAL GAS FIRED STORAGE TANK WATER HEATER

A. Acceptable Manufacturers:

1. A.O. Smith.
2. Lochinvar.
3. Rheem.

B. Type: Automatic, natural gas-fired, vertical storage.

C. Burner: Atmospheric.

D. Heat Exchanger: Submerged, glass lined.
E. Tank: Glass lined welded steel; 150 psi working pressure, multiple flue passages, inspection port, drain valve, thermally insulated with polyurethane, encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield.

F. Accessories:
   1. Factory installed temperature and pressure relief valve.
   2. Anode rods.

G. Refer to heater schedule on drawing for heater capacity and location.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Maintain manufacturer's recommended clearances around and over water heaters.

B. Install water heater on concrete housekeeping pad, minimum 4 inches high and 6 inches larger than water heater base on each side. Refer to Section 03 30 00.

C. Provide for connection to electrical service. Refer to Division 26.

D. Provide for connection to gas service. Refer to Division 23.

E. Provide piping connections and accessories as indicated on drawings.

F. Pipe relief valves independently to nearest floor drain.

G. Protect unit with protective covers during construction.

END OF SECTION 22 34 00
SECTION 22 40 00 - PLUMBING FIXTURES

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:
      1. Water closets.
      2. Urinals.
      3. Lavatories.
      4. Sinks.
      5. Electric water coolers.
   B. Related Sections:
      1. Section 079000 - Joint Protection: Product requirements for caulking between fixtures and building components for placement by this section.
      2. Section 221100 - Facility Water Distribution: Supply connections to plumbing fixtures.
      4. Section 260503 - Equipment Wiring Connections: Execution requirements for electric connections to sensor valves and faucets specified by this section.

1.3 REFERENCES
   A. American National Standards Institute:
      2. ANSI Z124.2 - Plastic Shower Units.
   B. Air-Conditioning and Refrigeration Institute:
      1. ARI 1010 - Self-Contained, Mechanically Refrigerated Drinking-Water Coolers.
   C. American Society of Mechanical Engineers:
      1. ASME A112.6.1 - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use.
      2. ASME A112.18.1 - Plumbing Fixture Fittings.
      4. ASME A112.19.2M - Vitreous China Plumbing Fixtures.
      5. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).
      6. ASME A112.19.4 - Porcelain Enameled Formed Steel Plumbing Fixtures.
7. ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks and Urinals.

D. American Society of Sanitary Engineering:
1. ASSE 1016 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

1.4 SUBMITTALS
A. Section 013300 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.5 CLOSEOUT SUBMITTALS
A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
B. Operation and Maintenance Data: Submit fixture, trim, exploded view and replacement parts lists.

1.6 QUALITY ASSURANCE
B. Provide products requiring electrical connections listed and classified by Underwriters Laboratories Inc., as suitable for purpose specified and indicated.

1.7 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING
A. Section 016000 - Product Requirements: Product storage and handling requirements.
B. Accept fixtures on site in factory packaging. Inspect for damage.
C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.9 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.

G. 2020 National Electrical Code; as Amended by the City of Woodstock.


L. Products: Listed and classified by Underwriter’s Laboratories, Inc. as suitable for the purpose specified and indicated.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for electric water coolers and domestic water chillers.

C. Furnish three year manufacturer warranty for electronic flush valves and electronic faucets.

PART 2 - PRODUCTS

2.1 Refer to Plumbing Fixture Schedule on plumbing drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify walls and floor finishes are prepared and ready for installation of fixtures.

C. Verify electric power is available and of correct characteristics.

D. Confirm millwork is constructed with adequate provision for installation of counter top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies loose key stops, reducers, and escutcheons to all fixtures.
C. Install components level and plumb.

D. Install and secure fixtures in place with floor mounted fixture carriers and bolts. Wall mounted lavatories and urinals shall not be mounted to a wall hanger unless there is no access to the chase.

E. Seal fixtures to wall and floor surfaces with mold resistant sealant, color to match fixture.

F. All exposed domestic water, sanitary and vent piping in finished area shall be chrome plated. Provide escutcheons around this piping passing through partitions, walls and floors.

G. All exposed domestic water, sanitary and vent piping within casework shall be chrome plated. Provide escutcheons around this piping passing through casework.

H. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

I. For ADA accessible water closets, install flush valve with handle to wide side of stall.

J. Install flush valves below grab bars with clearance from top of valve to bottom of grab bar as required by manufacturer.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop-drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit use of fixtures before final acceptance.

END OF SECTION 22 40 00
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:

1. Grounding electrodes and conductors.
2. Equipment grounding conductors.
4. Conduit and equipment supports.
5. Anchors and fasteners.
7. Wire markers.
8. Raceway markers.
10. Sealing and fireproofing of sleeves and openings between conduits, wireways, boxes and troughs.

1.3 REFERENCES
A. NECA (National Electrical Contractors Association) - Standard of Installation.

1.4 SYSTEM DESCRIPTION
A. Grounding systems use the following elements as grounding electrodes:

1. Metal underground water pipe.
2. Metal building frame.
3. Concrete-encased electrode.
4. Ground ring.
5. Rod electrode.

B. Anchor and fasten electrical products to building elements and finishes as follows:

1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors and preset inserts.
2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors.
5. Solid Masonry Walls: Provide expansion anchors and preset inserts.
7. Wood Elements: Provide wood screws.

C. Identify electrical components as follows:
   1. Nameplate for each electrical distribution and control equipment enclosure.
   2. Wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.
   3. Underground warning tape along length of each underground raceway or cable.

1.5 DESIGN REQUIREMENTS
   A. Select materials, sizes, and types of anchors, fasteners, and supports to carry loads of equipment and raceway, including weight of wire and cable in raceway.

1.6 PERFORMANCE REQUIREMENTS
   A. Grounding System Resistance: 25 ohms or less.

1.7 SUBMITTALS FOR REVIEW
   A. Coordination Shop Drawings: Provide 1/8” = 1'-0” scale drawings indicating location and elevation of all conduits 2” and larger, both above and below grade, pull boxes, panelboards, grounding electrodes, etc., prior to fabrication or installation of any work. Drawings shall also be submitted electronically in AutoCAD to ventilation contractor who will create "overlay" drawings indicating locations and elevations of work of all trades in different colors for final coordination and sign-off by all trades.

1.8 CLOSEOUT SUBMITTALS
   A. Project Record Documents: Provide updated version of 1/8” = 1'-0” scale coordination shop drawings indicating actual locations of items shown on the original drawings. Drawings shall include all revisions incorporated throughout the project. Drawings shall include updated plans views, circuiting, risers, panel schedules and routing of all feeders. Plans shall be submitted in PDF and created utilizing software packages such as AutoCAD or Adobe. Record documents produced utilizing hand markups will not be acceptable.

   B. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

1.9 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.10 REGULATORY REQUIREMENTS
   A. 2021 International Building Code; as Amended by the City of Woodstock.
   B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
   C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter’s Laboratories, Inc. as suitable for the purpose specified and indicated.

1.11 FIELD MEASUREMENTS
A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES
A. Material: Copper-clad steel.
B. Diameter: 3/4 inch or larger.
C. Length: 10'-0" or longer.

2.2 MECHANICAL CONNECTORS
A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.3 EXOTHERMIC CONNECTIONS
A. Manufacturers:
   1. Erico, Inc.
   2. Harger Lightning Protection.
   3. Thomas & Betts Corp.
B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

2.4 WIRE
A. Material: Stranded copper.
B. Foundation Electrodes: 4 AWG. or larger.
C. Grounding Electrode Conductor.
2.5 ANCHORS AND FASTENERS
A. Anchors and Fasteners: Compatible with application.
B. Materials and Finishes: Corrosion resistant.

2.6 FORMED STEEL CHANNEL
A. Manufacturers:
   1. Cooper B-Line.
   2. Unistrut.
B. Description: Galvanized steel.

2.7 SPRING STEEL CLIPS
A. Manufacturers:
   1. Cooper B-Line.
   2. Erico, Inc.
   3. Thomas & Betts Corp.

2.8 NAMEPLATES AND LABELS
A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
B. Letter Size:
   1. 1/4” letters for identifying individual equipment and loads.
C. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.9 WIRE MARKERS
A. Description: Cloth tape, split sleeve, or tubing type wire markers.
B. Legend:
   1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.
   2. Control Circuits: Control wire number as indicated on shop drawings, schematic and interconnection diagrams.

2.10 UNDERGROUND WARNING TAPE
A. Description: 4 inch wide plastic tape, colored red or yellow with suitable warning legend describing buried electrical lines.

2.11 SEALING AND FIREPROOFING
A. Fire and Smoke Rated Surfaces:
   1. Manufacturers:
a. 3M CP 25N/S or CP25S/L caulk.
b. 3M FS 195 wrap or strip with restricting collar.
c. 3M CS 195 composite sheet.
d. 3M Fire Barrier Moldable Putty Pads MPP+.
e. Pipe Shield, Inc. series F fire barrier kits.
f. Proset Systems fire rated floor and wall penetrations.
g. Insta-Foam Products Insta-Fire Seal Firestop Foam.
h. Dow Corning Fire Stop System.
i. Substitutions: Under provisions of Section 01 60 00.

B. General:
1. Furnish UL listed products or products tested by independent testing laboratory.
2. Select products with rating not less than rating of wall or floor being penetrated.

C. Non-Rated Surfaces:
1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.
3. For interior wall or floor openings, furnish one of the following to effect seal:
   a. Tremco Dymonic.
   b. Sika Corp. Sikaflex la.
   c. Sonneborn Sonolastic NPI.
   d. Mameco Vilken 116 urethane caulk.
   e. ATS acoustical Putty Pads for Junction Boxes.
   f. Substitutions: Under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Verify final backfill and compaction has been completed before driving rod electrodes.
B. Verify abandoned wiring and equipment serve only abandoned facilities.

3.2 INSTALLATION
A. Grounding and Bonding Installation:
1. Install rod electrodes at required locations. Install additional rod electrodes to achieve specified resistance to ground.
2. Install bonding meeting Regulatory Requirements.
3. Provide service grounding electrode from service to street side service entrance location of main water pipe. Provide jumper around water meter.
4. Provide grounding electrode connection to the metal frame of the building, where effectively grounded.
5. Provide and electrode encased by at least 2 inches of concrete, located within and near the bottom of a concrete foundation or footing that is in direct contact with the earth, consisting of at least 20 feet of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than copper conductor not smaller than No. 4.
6. Provide a ground ring encircling the building or structure, in direct contact with the earth at a depth below earth surface not less than 2 1/2 feet, consisting of at least 20 feet of bare copper conductor not smaller than No. 2.

7. Bond together metal siding not attached to grounded structure; bond to ground.

8. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

9. Locate and install anchors, fasteners, and supports in accordance with NECA “Standard of Installation”.

10. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

11. Do not use spring steel clips and clamps.

12. Obtain permission from Architect/Engineer before using powder-actuated anchors.

13. Obtain permission from Architect/Engineer before drilling or cutting structural members.

B. Supports:

1. Fabricate supports from structural steel or formed steel members. Rigidly weld members or install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.

2. Install surface mounted cabinets and panelboards with minimum of four anchors.

3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.

4. Install sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

C. Identification Components:

1. Degrease and clean surfaces to receive nameplates and labels.

2. Install nameplate and label parallel to equipment lines.

3. Secure nameplate to equipment front using screws, rivets, or adhesive.

4. Secure nameplate to inside surface of door on recessed panelboard in finished locations.

5. Identify underground conduits using one underground warning tape for each trench at 4 inches below finished grade.

D. Coordination With Other Trades:

1. Contractor shall coordinate the installation of their work with all other contractors of the project.

2. Install all work provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.

3. Install all work provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

E. Box Painting: Identify fire alarm system junction, pull and backboxes with paint, red in color.

F. Panelboard Schedules:

1. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
2. Provide typed circuit directory for each existing panelboard modified under contract. New directory shall include all existing loads previously documented in existing directory and new loads. Identify any breakers in existing panels that do not have load conductors terminated at their lugs and mark as spare. Leave spare breakers in the off position.

3. All panelboard schedules shall list the date created and the size and location (source panel and room) of the upstream over current protection for the feeder serving the panel.

3.3 SEALING AND FIREPROOFING

A. Fire Rated Surface:

1. Seal opening at floor, wall, partition, ceiling, and roof as follows:
   a. Install 12 gage steel sleeve through opening and extending beyond minimum of 1 inch on each side of building element.
   b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
   c. Pack void with backing material.
   d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.

2. Where conduit or other type of electrical raceway, bus or enclosure penetrates fire rated surface, install firestopping product in accordance with manufacturer's published instructions.

3. Utilize suitable and listed materials and methods to maintain fire and smoke resistive rating of all partitions. Penetration and boxes shall be installed and fire sealed to maintain listed partition ratings.

B. Non-Rated Surfaces:

1. Seal opening through non-fire rated wall, floor, ceiling, and roof opening as follows:
   a. Install 12 gage steel sleeve through opening and extending beyond minimum of 1 inch on each side of building element.
   b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
   c. Install type of firestopping material recommended by manufacturer.

2. Install escutcheons floor plates or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.

3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer’s instructions.

4. Interior partitions: Seal pipe penetrations at computer rooms, telecommunication rooms and data rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.

5. In acoustical partitions, install pads and sealant to maintain acoustical ratings.

C. Sleeves:
1. Sleeves shall be provided for all cable penetrations through partitions for any and all systems. Where sleeve size is not specified on the plans, sleeves shall be provided such that no sleeve is filled beyond 40%. Seal sleeve after completion of cable pulls. Minimum size sleeve shall be 3/4” EMT.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

END OF SECTION 26 05 00
SECTION 26 05 05 - SELECTIVE DEMOLITION FOR ELECTRICAL

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: Removal of existing electrical equipment, wiring, and conduit in areas to be remodeled; removal of designated construction; dismantling, cutting and alterations for completion of the Work.

1. Disposal of materials.
2. Storage of removed materials.
3. Identification of utilities.
4. Salvaged items.
5. Protection of items to remain as indicated on Drawings.
6. Relocate existing equipment to accommodate construction.

1.3 SCHEDULING

A. Schedule work to coincide with renovation schedule.

B. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

1.4 COORDINATION

A. Conduct demolition to minimize interference with adjacent building areas.

B. Coordinate demolition work with general contractor and other trades.

C. Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.

D. Shut-down Periods:

1. Arrange timing of shut-down periods of in service panels with Owner. Do not shut down any utility without prior written approval.
2. Keep shut-down period to minimum or use intermittent period as directed by Owner.
3. Maintain life-safety systems in full operation in occupied facilities, or provide notice minimum one week in advance.
4. Provide temporary power and wiring as required to maintain life-safety and other systems in operation in areas of building not affected by scope of work.
5. Identify salvage items in cooperation with Owner.
1.5 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify wiring and equipment indicated to be demolished serve only abandoned facilities.
C. Verify termination points for demolished services.

3.2 PREPARATION

A. Erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, Owner, Contractor's employees, and existing improvements to remain.
B. Temporary egress signage and emergency lighting

3.3 DEMOLITION

A. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
B. Remove exposed abandoned conduit including abandoned conduit above accessible ceiling finishes. Cut embedded conduit flush with walls, floors, and patch surfaces.
C. Remove conduit, wire, boxes, and fastening devices to avoid any interference with new installation.

D. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

E. Reconnect equipment being disturbed by renovation work and required for continue service to previous source if remaining or nearest available panel.

F. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit and wiring which are not part of final project.

G. Install temporary wiring and connections to maintain existing systems in service during construction.

H. Perform work on energized equipment or circuits with experienced and trained personnel utilizing appropriate PPE (Personal Protective Equipment).

I. Remove, relocate, and extend existing installations to accommodate new construction.

J. Repair adjacent construction and finishes damaged during demolition and extension work.

K. Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finish. Cut embedded support elements flush with walls and floors.

L. Clean and repair existing equipment to remain or to be reinstalled.

M. Protect and retain power to existing active equipment remaining.

N. Where demolition of a device or electrical equipment is called out for, remove equipment, associated wiring, accessible conduit and auxiliary devices unless otherwise amended by drawing notes or other specification sections.

O. Fluorescent Lamps and Ballasts shall be removed from demolished fixtures and disposed of in compliance with State and Federal EPA standards. Lamps shall be collected and compacted on site utilizing a crushing machine that contains all lamp waste. Lamps shall be recycled, provide Certificate of Recycling proving lamps have been recycled. Ballasts shall be recycled, provide Certificate of Recycling proving ballasts have been recycled.

3.4 EXISTING PANELBOARDS

A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.

B. Tag unused circuits as spare. Leave breakers in off position.

C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.

D. Remove existing wire no longer in use from panel to equipment.

E. Provide new updated directories where any circuits have been modified or rewired.
3.5 SALVAGE ITEMS
A. Remove and protect items indicated on Drawings to be salvaged and turn over to Owner.
B. Items of salvageable value may be removed as work progresses. Transport salvaged items from site as they are removed to location as directed by Owner.

3.6 REUSABLE ELECTRICAL EQUIPMENT
A. Carefully remove equipment, materials, or fixtures which are to be reused.
B. Disconnect, remove, or relocate existing electrical material and equipment interfering with new installation of any systems included in the project.
C. Relocate existing lighting fixtures as indicated on Drawings. Clean fixtures and re-lamp. Test fixture to see if it is in good working condition before installation at new location.

3.7 CLEANING
A. Remove demolished materials as work progresses. Legally dispose.
B. Keep workplace neat.

3.8 PROTECTION OF FINISHED WORK
A. Do not permit traffic over unprotected floor surface.
B. Coordinate floor protection with General Contractor or Construction Manager.

END OF SECTION 26 05 05
SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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:
      1. Building Wire and Cable.
      2. Wiring Connectors and Connections.

1.3 REFERENCES
   A. NECA Standard of Installation (National Electrical Contractors Association).
   C. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS
   A. See Division 01 for project requirements.
   B. Product Data: Submit for building wire and cable type.

1.5 CLOSEOUT SUBMITTALS
   A. Project Record Documents: Record actual locations of components and circuits.

1.6 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years experience.

1.7 REGULATORY REQUIREMENTS
   A. 2021 International Building Code; as Amended by the City of Woodstock.
   B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
   C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 PROJECT CONDITIONS
A. Verify that field measurements are as indicated.
B. Conductor sizes are based on copper.
C. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.

1.9 COORDINATION
A. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

PART 2 - PRODUCTS
2.1 BUILDING WIRE
A. Manufacturers:
   1. Allied Wire & Cable.
   2. Encore Wire.
   3. Cerro Wire and Cable.
   4. Southwire.
   5. Republic Wire.
B. Description: Single conductor insulated wire.
C. Conductor: Copper.
D. Insulation Voltage Rating: 600 volts.
E. Insulation: NFPA 70, Type THHN/THWN-2 or XHHW-2 for service-entrance conductors, feeders and branch circuits.

2.2 WIRING CONNECTORS
A. Provide connectors specifically designed for the conductor sizes utilized.
B. When splicing or connecting dissimilar metal conductors (copper to aluminum) use only UL listed, labeled and identified materials and methods.

C. All terminals and splicing shall be in accordance with NEC Section 110-14.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that interior of building has been protected from weather.

C. Verify that mechanical work likely to damage wire and cable has been completed.

D. Verify that raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire and cable.

3.3 INSTALLATION

A. Route wire and cable as required to meet Project Conditions.

B. Install cable in accordance with the NECA "Standard of Installation."

C. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

D. Use stranded conductors for control circuits.

E. Use conductor not smaller than 12 AWG for power and lighting circuits.

F. Use conductor not smaller than 18 AWG for control circuits.

G. Branch circuit wiring for 20 Amp circuits shall be adjusted for voltage drop:

1. 208/120V:
   a. 0-75' - #12 AWG Minimum
   b. 75'-150' - #10 AWG Minimum
   c. 150'-225' - #8 AWG Minimum

2. 480/277V:
   a. 0-100' - #12 AWG Minimum
   b. 100'-200' - #10 AWG Minimum
   c. 200'-300' - #8 AWG Minimum

H. Pull all conductors into raceway at same time.

I. Use suitable wire pulling lubricant for building wire 4 AWG and larger unless pre-lubricated.

J. Protect exposed cable from damage.
K. Support cables above accessible ceiling, using bridal rings. Do not rest cable on ceiling panels.

L. Use UL listed and labeled cable fittings and connectors.

M. Neatly train and lace wiring inside boxes, equipment, switchboards and panelboard enclosures.

N. Clean conductor surfaces before installing lugs and connectors.

O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

P. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

Q. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG.

R. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

S. Identify and color code wire and cable under provisions of Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.

T. All terminations, splices and taps shall be torqued in accordance with manufacturer’s recommendations. In the absence of connector or equipment manufacturer’s recommended torque values, use UL Standard 486A-B or NFPA70- Informative Annex I.

3.4 FIELD QUALITY CONTROL

A. Inspect and test prior to starting system.

END OF SECTION 26 05 19
SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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:
   1. Rod Electrodes.
   2. Wire.
   3. Mechanical Connectors.
   4. Exothermic Connections.

1.3 REFERENCES

A. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
B. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.
D. NFPA 70 - National Electrical Code.

1.4 GROUNDING SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes.
   1. Metal underground water pipe.
   2. Metal building frame.
   3. Concrete-encased electrode.
   4. Ground ring.
   5. Ground rod.
   6. Plate electrode.

1.5 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25 ohms or less. Capable of achieving 0.1 ohms or less at the sound system master technical, ground bus. The main utility ground electrode system may need to be augmented by supplementary ground electrode(s) to achieve this low resistance to ground.

B. Ground and bond entire electrical system in compliance with the National Electric Code.
1.6 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter’s Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

1.8 COORDINATION

A. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

A. Manufacturers:

1. Erico Inc.
2. Cadweld.
3. Harger Lightning Protection.
4. ILSCO.
5. Thomas & Betts Corp.

B. Product Description:

1. Material: Copper-clad steel.
3. Length: 10 feet.
2.2 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: 4 AWG.

C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements unless indicated larger.

2.3 MECHANICAL CONNECTORS

A. Manufacturers:
   1. Erico Inc.
   2. Cadweld.
   3. Harger Lightning Protection.
   4. ILSCO.
   5. Thomas & Betts Corp.

B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.4 EXOTHERMIC CONNECTIONS

A. Manufacturers:
   1. Erico Inc.
   2. Cadweld.
   3. Harger Lightning Protection.
   4. ILSCO.
   5. Thomas & Betts Corp.

B. Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

A. Remove paint, rust, mill oils, surface contaminants at connection points.

3.3 EXISTING WORK

A. Verify that existing grounding system is effectively grounded.

B. Modify existing grounding system to maintain continuity to accommodate renovations.

C. Extend existing grounding system using material and methods compatible with existing electrical installations, or as specified.
3.4 INSTALLATION

A. Install in accordance with IEEE.

B. Install rod electrodes at locations as indicated on Drawings. Install additional rod electrodes to achieve specified resistance to ground.

C. Install grounding and bonding conductors concealed from view.

D. Install 4 AWG bare copper wire in foundation footing where available.

E. Bond together reinforcing steel and metal accessories in pool structures.

F. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel.

G. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

H. Equipment Grounding Conductor. At any junction box or enclosure where a splice or connection is made to the current carrying conductors within the box, provide a bond between the Equipment Grounding Conductor and the metal junction box.

I. Provide service grounding electrode from service to street side service entrance location of main water pipe. Provide jumper around water meter.

J. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

K. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.

L. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.

M. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground resistance testing in accordance with IEEE 142.

D. Perform leakage current tests in accordance with NFPA 99.
E. Perform continuity testing in accordance with IEEE 142.

F. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION 26 05 26
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:
      1. Conduit and equipment supports.
      2. Anchors and fasteners.
      3. Roof Mounted Conduit Supports

1.3 REFERENCES
   A. NECA - National Electrical Contractors Association.
   B. NFPA 70 - National Electrical Code.

1.4 REGULATORY REQUIREMENTS
   A. 2021 International Building Code; as Amended by the City of Woodstock.
   B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
   C. 2021 International Fire Code; as Amended by the City of Woodstock.
   G. 2020 National Electrical Code; as Amended by the City of Woodstock.
   L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the
      purpose specified and indicated.
1.5 SUBMITTALS
A. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
B. Product Data:
   1. Hangers and Supports: Manufacturers’ catalog data including load capacity.
C. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.
D. Manufacturer's Installation Instructions:
   1. Hangers and Supports: Special procedures and assembly of components.
E. Manufacturer's Certificate: Products meet or exceed specified requirements.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS
A. Materials and Finishes: Provide adequate corrosion resistance.
B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
C. Anchors and Fasteners:
   1. Concrete Structural Elements: Provide precast inserts, expansion anchors, epoxy anchors and preset inserts.
   2. Steel Structural Elements: Provide beam clamps, steel ramset fasteners, and welded fasteners.
   5. Solid Masonry Walls: Provide expansion anchors, expansion anchors, and preset inserts.
   7. Wood Elements: Provide wood screws.

2.2 CONDUIT SUPPORTS
A. Manufacturers:
   1. ABB, Electrification Business.
   2. Adalet.
   3. CADDY; nVent.
   5. MIRO Industries.
   6. Unistrut; Atkore International.
   7. Cooper B-Line.
   8. Substitutions: Under provisions of Section 01 60 00.
B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit Clamps for Trapeze Hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit Clamps - General Purpose: One hole malleable iron for surface mounted conduits.

2.3 STEEL CHANNEL

A. Manufacturer:
   1. Cooper B-Line.
   2. Unistrut.
   4. Substitutions: Under provisions of Section 01 60 00.

B. Description:
   1. Indoor: Galvanized steel, channel, size accordingly to accommodate load served.
   2. Outdoor: Finished with manufacturer corrosion resistant finish, channel, size accordingly to accommodate load served.
   3. Corrosive Environments: Stainless steel, channel, size accordingly to accommodate load served.

2.4 ROOF MOUNTED PIPING AND CONDUIT SUPPORTS

A. Acceptable Manufacturer: Dura-Blok.

B. 5" tall, UV resistant rubber block with bolted strut channel for conduit attachment.

C. Base shall be made from 100% recycled rubber, with drainage channel through center of block. Where elevation above 5" is required, utilize additional strut material to construct rack to height of required elevation.

D. Provide 1/2" thick UV resistance rubber pad under block extending a minimum 1" beyond block in all directions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Hangers and Supports:
   1. Anchors and Fasteners:
a. Concrete Structural Elements: Provide precast inserts, expansion anchors, epoxy anchors and preset inserts.
b. Steel Structural Elements: Provide beam clamps, steel ramset fasteners, and welded fasteners.
c. Concrete Surfaces: Provide self-drilling anchors, epoxy anchors, and expansion anchors.
d. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
e. Solid Masonry Walls: Provide expansion anchors, expansion anchors, and preset inserts.
g. Wood Elements: Provide wood screws.

D. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

E. Do not use spring steel clips and clamps.

F. Do not use powder-actuated anchors.

G. Obtain permission from Architect/Engineer before drilling or cutting structural members.

H. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts. Paint exposed ends of steel channels to protect from corrosion. Provide plastic end caps by steel channel manufacture for all exposed ends below 8’.

I. Install surface-mounted cabinets with minimum of four anchors.

J. Contractor shall coordinate the installation of their work with all other contractors of the project.

K. Install all hangers and supports provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.

L. Install all hangers and supports provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

M. Do not suspend equipment from roof decking.

END OF SECTION 26 05 29
SECTION 26 05 33 - RACEWAY AND BOXES

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:
   1. Conduit and Tubing.
   2. Surface Raceways.
   3. Wireways.
   4. Outlet Boxes.
   5. Pull and Junction Boxes.
   6. Wall and ceiling outlet boxes.

1.3 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
C. ANSI C80.5 - Rigid Aluminum Conduit.
D. NECA (National Electrical Contractor’s Association) - "Standard of Installation"
E. NEMA FB 1 (National Electrical Manufacturers Association) - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
F. NEMA OS 1 (National Electrical Manufacturers Association) - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
G. NEMA OS 2 (National Electrical Manufacturers Association) - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
H. NEMA RN 1 (National Electrical Manufacturers Association) - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
I. NEMA TC 2 (National Electrical Manufacturers Association) - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
J. NEMA TC 3 (National Electrical Manufacturers Association) - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
K. NEMA WD 6 - Wiring Device Configurations.
L. NEMA 250 (National Electrical Manufacturers Association) - Enclosures for Electrical Equipment (1000 Volts Maximum).
1.4 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

B. Underground Outside Foundation Wall: Provide rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit, schedule 80 PVC. Where approved by all bodies having jurisdiction and indicated on drawings, provide nonmetallic conduit with steel elbows. Provide cast boxes.

C. In or Under Slab on Grade: Provide rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit, schedule 40 PVC. Where approved by all bodies having jurisdiction and indicated on drawings, provide nonmetallic conduit with steel elbows. Provide cast boxes.

D. Outdoor Locations, Above Grade: Provide rigid steel and aluminum conduit. Provide cast metal outlet, pull, and junction boxes.

E. In Slab Above Grade: Provide rigid steel conduit or intermediate metal conduit or where approved by all bodies having jurisdiction; provide thickwall nonmetallic conduit with steel elbows. Provide cast or sheet metal boxes.

F. Wet and Damp Locations: Provide rigid steel and aluminum conduit. Provide cast metal, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

G. Concealed Dry Locations: Provide rigid steel and aluminum conduit, intermediate metal conduit or electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pullboxes. Conduits 2” and below may be electrical metallic tubing. Conduits over 2” shall be rigid steel and aluminum conduit, intermediate metal conduit, unless indicated otherwise on drawings.

H. Exposed Dry Locations (unfinished areas): Provide rigid steel and aluminum conduit or intermediate metal conduit where subject to damage, otherwise provide electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pullboxes. Conduits 2” and below may be electrical metallic tubing. Conduits over 2” shall be rigid steel and aluminum conduit, intermediate metal conduit, unless indicated otherwise on drawings.

I. Exposed Dry Locations (Finished areas): Provide surface mounted raceways systems.

J. Flexible Metal Conduits: Provide for final connections (maximum 6 feet) at indoor dry locations of conductors serving equipment subject to vibration or luminaires above accessible ceilings.

K. Liquidtight Flexible Metal Conduits: Provide for final connections (maximum 6 feet) at indoor damp/wet/corrosive locations, mechanical rooms containing hydronic equipment, and outdoor locations of conductors serving equipment subject to vibration.

L. Sleeves: Provided for all cable penetrations though partitions for any and all systems. Where sleeve size is not specified on the plans, sleeves shall be provided such that no sleeve is filled beyond 40%. Seal sleeve after completion of cable pulls. Minimum size sleeve shall be 3/4” EMT.
1.5 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.6 DESIGN REQUIREMENTS

A. Minimum raceway size for concealed or exposed locations within building: 3/4 inch. 1/2 inch conduit will be acceptable for end of the line (no more than one circuit). Branch conduits to receptacles or lighting fixtures.
B. Install all conduits concealed unless specifically called out on the drawings to be exposed. Where structural elements of the building conflict with routing of concealed conduits, contractor shall route concealed via floors, slabs, ceiling spaces or adjoining wall to bypass structural elements that can not be crossed by recessed conduits.
C. Where installing new raceways on existing walls, raceways are to be complete surface metallic raceway system.
D. Ceiling mounted devices shall be installed on a recessed metallic backbox. Provide concealed raceway system over gypsum ceilings to nearest accessible ceiling. Provide tile bridge to support backbox compatible with specified ceiling system.
E. Minimum raceway size in or below slab on grade: 1 inch.
F. Conduit Size: ANSI/NFPA 70.

1.7 SUBMITTALS

A. Product Data: Submit for surface raceway system. Provide dimensions, knockout sizes and locations, materials, fabrication details, finishes, and accessories.
B. Manufacturer’s Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.8 CLOSEOUT SUBMITTALS

A. Project Record Documents:
   1. Record actual routing of conduits larger than 2 inch trade size.
   2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.10 QUALITY ASSURANCE

A. Perform work in accordance with NECA Standard of Installation.

1.11 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.12 COORDINATION

A. Coordinate installation of outlet boxes for equipment connected under other sections.

B. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

C. Contractor shall coordinate the installation of their work with all other contractors of the project.

D. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.

E. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

PART 2 - PRODUCTS

2.1 METAL CONDUIT

A. Manufacturers:
   1. Allied Tube and Conduit Corp.
2. Republic Conduit.
3. Wheatland Tube Company.
4. Substitutions: Under provisions of Section 01 60 00.

B. Rigid Steel Conduit: ANSI C80.1.
C. Rigid Aluminum Conduit: ANSI C80.5.
D. Intermediate Metal Conduit (IMC): Rigid steel.
E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.2 FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Alflex.
   2. Anamet Electrical.
   3. Electri-Flex Co.
   4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: Interlocked steel or aluminum construction.
C. Fittings: NEMA FB 1.

2.3 LIQUITIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Alflex.
   2. Anamet Electrical.
   3. Electri-Flex Co.
   4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: Interlocked steel or aluminum construction with PVC jacket.
C. Fittings: NEMA FB 1.

2.4 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied Tube and Conduit Corp.
   2. Republic Conduit.
   3. Wheatland Tube Company.
   4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: ANSI C80.3; galvanized tubing.
C. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression type.
D. Provide color coded conduit for sizes 1/2" thru 4". Finish shall be factory applied by the manufacture. Conduit shall be available in 8 color options.
   1. Yellow
2. Blue
3. Red
4. Green
5. Purple
6. Orange
7. White
8. Black

E. Provide "red" conduit for fire alarm conductors/cables.

### 2.5 NONMETALLIC CONDUIT

A. Manufacturers:

1. Cantex, Inc.
2. Carlon Electrical Products.
3. PW Pipe.
4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: NEMA TC 2; Schedule 40 or outdoors provide Schedule 80 PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

### 2.6 WIREWAY

A. Manufacturers:

1. Cooper B-Line.
2. Hoffman.

B. Product Description: General purpose or Oiltight and dusttight or Raintight type wireway.

C. Knockouts: Manufacturer's standard.

D. Size: 4 x 4 inch unless indicated larger on drawings. Provide length as required.

E. Cover: Screw cover with full gasketing.

F. Finish: Rust inhibiting primer coating with gray enamel finish.

### 2.7 OUTLET BOXES

A. Manufacturers: Minimum depth 2 1/8"

1. Appleton Electric.
2. OZ Gedney.
3. Raco.
4. Red Dot.
5. Thomas & Betts.

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 3/4 inch male fixture studs where required.
2. Concrete Ceiling Boxes: Concrete type.

C. Cast Boxes: NEMA FB 1, Type FD, aluminum or cast ferroly. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

D. Wall Plates for Finished Areas: As specified in Section 26 27 26.

E. Wall Plates for Unfinished Areas: Furnish gasketed cover.

F. Outlet boxes containing fire alarm cabling and devices shall be "red" in color.

2.8 AUDIO/VISUAL BACKBOXES

A. Manufacturers: Minimum depth 3”
   1. Hubbell #HBL260.
   2. Thomas and Betts 4 Square.
   3. Raco #260.

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
   1. Audio Visual Back Boxes: Concentric knock outs with combinations of 3/4”, 1”, 1 1/4”, 1 1/2”, 2” are required. Minimum (2) 2” knock outs are required.

2.9 PULL AND JUNCTION BOXES

A. Manufacturers:
   1. Appleton Electric.
   2. Hoffman.
   3. OZ Gedney.
   4. Raco.
   5. Thomas & Betts.

B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 4 or 4X; flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

D. In-Ground Cast Metal Box: NEMA 250, Type 6, outside or inside flanged, recessed cover box for flush mounting:
   1. Material: Galvanized cast iron.
   2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
   3. Cover Legend: "ELECTRIC".

E. Fiberglass Concrete composite Handholes: Die-molded, glass-fiber concrete composite hand holes:
1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.
2. Cover: Glass-fiber concrete composite, weatherproof cover with nonskid finish.

F. Junction boxes containing fire alarm cabling and devices shall be "red" in color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations of outlets in offices and work areas prior to rough-in. Review all casework shop drawings and existing conditions prior to rough in. Report discrepancies to architect for direction.

3.2 INSTALLATION

A. Install raceway and boxes in accordance with NECA "Standard of Installation."
B. Ground and bond raceway and boxes in accordance with Section 26 05 26.
C. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.
D. Identify raceway and boxes in accordance with Section 26 05 53.
E. Arrange raceway and boxes to maintain headroom and present neat appearance.
F. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
G. Maintain headroom and present neat mechanical appearance.
H. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
I. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
J. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
K. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
L. Use flush mounting outlet box in finished areas.
M. Raceways and boxes shall not be mounted to or ran across floors or slabs.

3.3 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
B. Arrange raceway supports to prevent misalignment during wiring installation.
C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 26 05 29; provide space on each for 25 percent additional raceways.

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel specified in Section 26 05 29.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Route conduit in and under slab from point-to-point.

K. Maintain clearance between raceway and piping for maintenance purposes.

L. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

M. Cut conduit square using saw or pipe cutter; de-burr cut ends.

N. Bring conduit to shoulder of fittings; fasten securely.

O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

P. Install conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

Q. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch size.

R. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

S. Install fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.

T. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

U. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

V. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

W. Close ends and unused openings in wireway.

X. Flexible raceway systems shall not be used to penetrate roofs, floors and air/moisture barriers.

Y. Raceway systems shall not be routed thru or in HVAC ducts.
Z. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve. Provide products such as Link-Seal.

AA. Raceways routed exposed in finished areas shall be painted to match building surroundings. Submit conduit installation plans for exposed area for color assignments.

BB. Raceway labels shall be applied at intervals not exceeding 10’ on center. Apply labels to all feeders, or branch circuits over 60 amps in size. Provide raceway labels where conduits rise through floors or ceilings, and where they enter panelboards, distribution boards, pull boxes, wireway. Minimum of one raceway label per length of raceway. Raceway labels shall indicate voltage of feeder contained in raceway.

3.4 INSTALLATION - SURFACE RACEWAYS

A. Install Products in accordance with manufacturer's instructions.

B. Use screws to fasten raceway channel to surfaces. Drill all tile and brick surfaces or fasten into grout lines to limit the damage to these surfaces. Construction adhesive may be used to assist in the mounting of raceway, but shall not be the primary method of support. Mount plumb and level or align with block joints to create a level appearance.

C. Close ends of raceway and unused conduit openings.

D. Ground and bond raceway under provisions of Section 26 05 26.

E. Provide supplemental lumber furring as required to shim surface raceway off of existing walls to allow for installation around columns, imperfections or other obstructions on face of wall. Furring shall be pine or oak lumber, Grade “A”. Plywood or composite wood shall not be acceptable.

F. Surface raceways shall be routed exposed between floor and ceiling. Raceway system shall not protrude above ceiling, through walls or floors or into nonaccessible spaces.

3.5 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.

B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.

C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.

D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

E. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.
H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
I. Install stamped steel bridges to fasten flush mounting outlet box between studs.
J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
K. Install adjustable steel channel fasteners for hung ceiling outlet box.
L. Do not fasten boxes to ceiling support wires or other piping systems.
M. Support boxes independently of conduit.
N. Install gang box where more than one device is mounted together. Do not use sectional box.
O. Install gang box with plaster ring for single device outlets.
P. Use cast outlet box in exterior locations exposed to the weather and wet locations.
Q. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.
R. Where existing boxes are utilized it shall be the contractors responsibility to modify as required to meet the intent of this specification.

3.6 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using approved materials and methods.
B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.
C. Locate outlet boxes to allow luminaires positioned as indicated on reflected ceiling plan.
D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
E. Contractor shall coordinate the installation of their work with all other contractors of the project.
F. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.
G. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

3.7 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.
B. Install knockout closures in unused openings in boxes.
3.8 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION 26 05 33
SECTION 26 05 34 - FLOOR BOXES

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:
   1. Floor Boxes.

1.3 REFERENCES
A. NECA (National Electrical Contractors Association) - Standard of Installation.
B. NEMA OS 1 (National Electrical Manufacturers Association) - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

1.4 SUBMITTALS
A. Product Data: Submit catalog data for floor boxes service fittings.
B. Samples: Upon request of the engineer, submit two of each service fitting illustrating size, material, configuration, and finish.

1.5 CLOSEOUT SUBMITTALS
A. Project Record Documents: Record actual locations of each floor box and poke-through fitting.

1.6 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 FLOOR BOXES

A. Manufacturers:
   1. Legrand.
   2. Hubbell.
   3. Substitutions: Under provisions of Section 01 60 00.

B. Floor Boxes: NEMA OS 1, provide number of gangs as indicated on the drawings. Provide deep boxes whenever possible. Shallow boxes shall be acceptable in minimum concrete depth areas only.

C. Adjustability: Fully adjustable.

D. Material:
   1. In slab on grade; cast metal.
   2. In slab above grade; formed steel.

E. Configuration: Provide configuration of receptacles, voice, data and/or television outlets as indicated on drawings.

F. Shape: Rectangular, unless indicated otherwise on drawings.

G. Cover: Flush, flip top cover with carpet trim.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations of floor boxes and outlets prior to rough-in.

3.2 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Boxes and fittings are indicated on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet to accommodate intended purpose.
C. Contractor shall meet with Architect or Owner representative in field to determine exact location of floor boxes.

D. Floor Box Requirements: Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

E. Set floor boxes level.

F. Install boxes and fittings to preserve fire resistance rating of slabs and other elements, using materials and methods specified in Section 07 84 00 and 26 05 29.

G. Install protective rings on active flush cover service fittings.

H. Provide blank cover plates or closure plugs over abandoned floor boxes and poke through fittings.

3.3 ADJUSTING

A. Adjust floor box flush with finish flooring material.

3.4 CLEANING

A. Clean interior of boxes to remove dust, debris, moisture and other material.

END OF SECTION 26 05 34
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:
   1. Nameplates and labels.
   2. Wire and cable markers.
   3. Raceway Labels.
   4. Junction Box Labeling

1.3 REFERENCES

A. NFPA 70 - National Electrical Code.

1.4 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.
PART 2 - PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

1. Locations:
   a. Each electrical distribution and control equipment enclosure.
   b. Disconnect, starters, enclosed circuit breakers and transformers
   c. Security control equipment and enclosures.
   d. Communication cabinets.

2. Letter Size: Use 1/4 inch letters for identifying equipment and describing areas served.

B. Labels: Machine made labels, Brother P-Type Thermal adhesive tape or similar.

1. Locations:
   a. Each receptacle faceplate. Confirm installation on back or front of each faceplate with owner and architect prior to installing label.
   b. Line Voltage Light Switches and Lighting Control Devices. Install on back side of device faceplate.
   c. Low Voltage Lighting Control Devices. Install on back side of device faceplate.
   d. Lighting Control Power Packs or Relay Packs. Adhere label to power pack in location so as to not obscure manufactures labels or nameplates.

2. Letter Size: Minimum 1/8 inch indicating panel and circuit serving load. For low Voltage Lighting Control Devices, indicate panel and circuit serving the loads controlled by the Low Voltage Lighting Control Device.

2.2 WIRE MARKERS

A. Description: Tape, split sleeve, or tubing type wire markers.

B. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2.3 CONDUCTOR COLOR CODING

A. Description: Color code all wire and cable as scheduled.

B. Location: Color coding shall be continuous in the wire insulation or jacket. Where colors cannot be provided, apply color coding tape of the color designated in sufficient quantity for permanency at all exposed terminals, loops and splices.

C. Wire Color Coding Schedule:
1. 208/120V., 3 phase, 4 wire system:
   A Phase - Black
   B Phase - Red
   C Phase - Blue
   Neutral - White
   Ground - Bare or Green

2. 480/277V., 3 phase, 4 wire system:
   A Phase - Brown
   B Phase - Orange
   C Phase - Yellow
   Neutral - Gray
   Ground - Bare or Green with Yellow Stripe

2.4 BOX MARKERS
A. Description: All junction boxes and device boxes serving fire alarm system devices and wiring shall be "red" in color.

2.5 RACEWAY MARKERS
A. Provide raceway markers on all raceway for feeders and branch circuits over 60 amps. Markers shall indicate operating voltage of conductors contained within raceway.
B. Black letters on orange background. Adhesive applied.
   1. Manufactures
      a. Brady
      b. Seton

2.6 PANELBOARD SCHEDULES
A. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads or other field changes
B. Provide typed circuit directory for each existing panelboard modified under contract. New directory shall include all existing loads previously documented in existing directory and new loads. Identify any breakers in existing panels that do not have load conductors terminated at their lugs and mark as spare. Leave spare breakers in the off position.
C. All panelboard schedules shall list the date created and the size and location (source panel and room) of the upstream over current protection for the feeder serving the panel.

2.7 JUNCTION/PULL BOX LABELING
A. All branch circuit junction and pull boxes shall be labeled with the source panel, circuits contained therein and the system voltage. Labeling for boxes smaller then 8”x8” may be applied utilizing permanent marker or machine made labels. Pull boxes then 8”x8” shall be by machine made label only.
B. All feeder junction and pull boxes shall be labeled with the source panel, load name, and system voltage. Labeling for all feeder junction and pull boxes shall be applied utilizing machine made labels only.
2.8 UNDERGROUND WARNING TAPE

A. Provide detectable underground warning tape along length of each underground raceway or cable. Brady #B-721 or similar.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

A. Install nameplate and label parallel to equipment lines.

B. Secure nameplate to equipment front using screws, rivets, or adhesive.

C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

E. Provide typed panelboard directories inside all panelboards indicating description of load served.

END OF SECTION 26 05 53
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:
   1. Occupancy Sensors.
   2. Network Lighting Controls

1.3 WORK INCLUDED
A. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.
B. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 26.
C. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, fixtures, HVAC systems and building management systems.

1.4 SUBMITTALS FOR REVIEW
A. See Division 01 for project requirements.
B. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.
C. Submit a lighting plan clearly marked by manufacturer showing proper product, location and orientation of each sensor.
D. Submit any interconnection diagrams per major subsystem showing proper wiring.
E. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.
F. Submittals and complete system layout and bill of materials shall be prepared by a factory authorized Representative.
1.5 QUALITY ASSURANCE

1.6 QUALIFICATIONS
   A. Products supplied shall be from a manufacturer that has been continuously involved in the manufacturing of occupancy sensors for a minimum of five (5) years.

1.7 REGULATORY REQUIREMENTS
   A. 2021 International Building Code; as Amended by the City of Woodstock.
   B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
   C. 2021 International Fire Code; as Amended by the City of Woodstock.
   G. 2020 National Electrical Code; as Amended by the City of Woodstock.
   L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 SYSTEM OPERATION
   A. It shall be the contractor's responsibility to make all proper adjustments to assure owner's satisfaction with the occupancy system.
   B. Factory Commissioning: It shall be the manufacturer's responsibility to verify all proper adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system.

1.9 WARRANTY
   A. The manufacturer shall provide a minimum five-year warranty on all hardware devices supplied and installed.
   B. The hardware warranty shall cover repair or replacement any defective products within the warranty period.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Acuity nLight.
2. Hubbell Lighting Control NX.
3. WattStopper DLM.

2.2 OCCUPANCY SENSORS

A. Wall Switch Occupancy Sensors:

1. All Wall Switch Occupancy Sensors:
   a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
   b. Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.
   c. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
   d. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
   e. Finish: Selected by the Architect.

B. Ceiling Mounted Occupancy Sensors:

1. All Ceiling Mounted Occupancy Sensors:
   a. Description: Low profile occupancy sensors designed for ceiling installation.
   b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
   c. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
   d. Locate sensors away from areas with strong air currents such as adjacent to HVAC diffusers.
   e. Layout of sensors shall account for sensitivity adjustments below maximum and any absorptive materials such as carpeting or material covered partitions.
   f. Finish: White unless indicated otherwise.

C. Power Packs:

1. Power Packs for Low Voltage Occupancy Sensors:
2. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
3. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
4. Input Supply Voltage: Dual rated for 120/277 VAC.
5. Load Rating: 20 amperes.
6. Control wiring between sensors and controls units shall be Class II, 18-24 AWG, stranded UL Classified. All control wiring shall be plenum-rated.

2.3 NETWORK LIGHTING CONTROLS

A. System Architecture

1. System shall have an architecture that is based upon three main concepts: (a) networkable intelligent lighting control devices, (b) standalone lighting control zones using distributed intelligence, (c) optional system backbone for remote, time based and global operation between control zones.

   a. Intelligent lighting control devices shall have individually addressable network communication capability and consist of one or more basic lighting control components: occupancy sensor, photocell sensor, relay, dimming output, contact closure input, analog 0-10V input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these components into a single device enclosure shall be permissible so as to minimize overall device count of system.

   b. Lighting control zones consisting of one or more networked luminaires and intelligent lighting control devices and shall be capable of providing automatic control from sensors (occupancy and/or photocell) and manual control from local wallstations without requiring connection to a higher level system backbone; this capability is referred to as "distributed intelligence."

   c. System must be capable of interfacing directly with networked luminaires such that low voltage network cabling is used to interconnect networked luminaires with control components such as sensors, switches and system backbone.

2. The system shall be capable of providing individually addressable switching and dimming control of the following: networked luminaires, control zones to include multiple switch legs or circuits, and relay and dimming outputs from centralized panels to provide design flexibility appropriate with sequence of operations required in each project area or typical space type. A single platform shall be used for both indoor and outdoor lighting controls.

3. Lighting control zones shall be capable of being networked with a higher level system backbone to provide time based control, remote control from inputs and/or systems external to the control zone, and remote configuration and monitoring through a software.

4. All system devices shall support remote firmware update, such that physical access to each device is not necessary, for purposes of upgrading functionality at a later date.

5. System shall be capable of “out of box” sequence of operation for each control zone. Standard sequence is:

   a. All switches control all fixtures in a zone.

   b. All occupancy sensors automatically control all fixtures in the control zone with a default timeout.

B. Wired Networked Control Zone Characteristics
1. Following proper installation and provision of power, all networked devices connected together with low voltage network cable shall automatically form a functional lighting control zone without requiring any type of programming, regardless of the programming mechanism (e.g., software application, handheld remote, pushbutton). The "out of box" default sequence of operation is intended to provide typical sequence of operation so as to minimize the system startup and programming requirements and to also have functional lighting control operation prior to system startup and programming.

2. System shall be able to automatically discover all connected devices without requiring any provisioning of system or zone addresses.

3. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:
   a. Low-Voltage power sensing: These devices shall automatically provide 100% light level upon detection of loss of power sensed via the low voltage network cable connection.
   b. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard, and shall automatically close the load control relay(s) and provide 100% light output upon detection of loss of power sensed via line voltage connections.
   c. Emergency egress devices shall be provided and UL labeled by the lighting control manufacturer.

C. System Backbone and System Integration Equipment

1. System Controller
   a. System Controller shall be a multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
   b. System Controller shall perform the following functions:
      1) Facilitation of global network communication between different areas and control zones.
      2) Time-based control of downstream wired network devices.
      3) Linking into an Ethernet network.
      4) Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
      5) Connection to various software interfaces, including management interface, historical database and analytics interface, visualization interface, and personal control applications.
   c. System Controller shall not require a dedicated PC or a dedicated cloud connection.
   d. Device shall automatically detect all networked devices connected to it, including those connected to wired communication bridges.
   e. Device shall have a standard and astronomical internal time clock.
   f. Shall be capable of connecting to the building Local Area Network (LAN) via IEEE 802.11.x Wireless and IEEE 802.3 Wired connection.

2.4 WIRED NETWORKED DEVICES

A. Wired Networked Wall Switches, Dimmers, Scene Controllers
1. Wall switches & dimmers shall support the following device options:
   a. Number of control zones: 1, 2 or 4
   b. Control Types Supported: On/Off or On/Off/Dimming

2. Scene controllers shall support the following device options:
   a. Number of scenes: 1, 2 or 4
   b. Control Types Supported:
      1) On/Off or On/Off/Dimming
      2) Preset Level Scene Type
      3) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene
      4) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones

B. Wired Networked Auxiliary Input / Output (I/O) Devices
   1. Auxiliary Input/Output Devices shall be specified as an input or output device with the following options:
      a. Contact closure input: Input shall be programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, ramp light level up or down, or toggle lights on/off.
      b. 0-10V analog input: Input shall be programmable to function as a daylight sensor.
      c. RS-232/RS-485 digital input: Input supports activation of up to 4 local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
      d. 0-10V dimming control output, capable of sinking a minimum of 20mA of current: Output shall be programmable to support all standard sequence of operations supported by system.

C. Wired Networked Occupancy and Photosensors
   1. Sensors shall utilize passive infrared (PIR) or passive dual technology (PDT) to detect both major and minor motion as defined by NEMA WD-7 standard.
   2. Sensing technologies that are acoustically passive, meaning they do not transmit sounds waves of any frequency do not require additional commissioning. Ultrasonic or Microwave based sensing technologies may require commissioning due to the active nature of their technology, if factory required.
   3. Sensor programming parameter shall be available and configurable remotely from the software and locally via the device.
   4. Sensor mounting type shall match project design requirements as shown on plans.
      a. Sensors shall have optional features for photosensor/daylight override, dimming control, and low temperature/high humidity operation.
   5. The system shall support the following types of photocell-based control:
a. **On/Off:** The control zone is automatically turned off if the photocell reading exceeds the defined setpoint and automatically turned on if the photocell reading is below the defined setpoint. A time delay or adaptive setpoint adjustable behavior may be used to prevent the system from exhibiting nuisance on/off switching.

b. **Continuous Dimming:** The control zone automatically adjusts its dimming output in response to photocell readings, such that a minimum light level consisting of both electric light and daylight sources is maintained at the task. The photocell response shall be configurable to adjust the photocell setpoint and dimming rates.

D. **Distributed System Power, Switching and Dimming Controls**

1. Devices shall incorporate one optional Class 1 relay, optional 0-10 VDC dimming output, and contribute low voltage Class 2 power to the rest of the system.

2. Device programming parameters shall be available and configurable remotely from the software and locally via the device push-button.

3. Device shall be plenum rated.

4. Devices shall be UL Listed for load and load type as specified on the plans.

**PART 3 - EXECUTION**

3.1 **EXAMINATION**

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 **PREPARATION**

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

C. Protect installation from dust and debris of other construction activities.

3.3 **INSTALLATION**

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and ADA, including mounting heights specified in those standards unless otherwise indicated.
B. Coordinate locations of outlet boxes provided under Section 26 05 33 as required for installation of lighting control devices provided under this section.

1. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
2. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame unless indicated otherwise.

C. Install and aim sensors in locations to achieve not less than 95 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer’s written instructions.

D. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceiling or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

E. Install lighting control devices in accordance with manufacturer’s instructions.

F. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

G. Install lighting control devices plumb and level, and held securely in place.

H. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 27 26.

I. Provide required supports in accordance with Section 26 05 29.

J. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

K. Identify components and power and control wiring according to Section 26 05 53.

L. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

M. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

N. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 INSTALLATION REQUIREMENTS

A. Auxiliary and Miscellaneous Power Requirements:

1. The installing contractor shall provide all required 120V circuits required for complete operation. Upon completion of submittal document, installing contractor shall coordinate with manufacture to identify system component require 120V power connections and shall include those power connections as part of the contract at no additional costs.
B. Complete and functional system. Provide all required wiring, materials, circuits, programming and labor required for a complete and operational lighting control system.

C. Installation Procedures and Verification

1. The successful bidder shall review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.

2. The successful bidder shall install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications.

3. The successful bidder shall be responsible for testing of all low voltage network cable included in the bid. Bidder is responsible for verification of the following minimum parameters:

   a. Wire Map (continuity, pin termination, shorts and open connections, etc.)
   b. Length
   c. Insertion Loss

D. Coordination with Owner's IT Network Infrastructure

1. The successful bidder is required to coordinate with the Owner's representative to secure all required network connections to the owner's IT network infrastructure.
   a. The bidder shall provide to the Owner's representative all network infrastructure requirements of the networked lighting control system.
   b. The bidder shall provide to the manufacturer's representative all necessary contacts pertaining to the Owner's IT infrastructure, to ensure that the system is properly connected and started up.

E. Documentation and Deliverables

1. The installing contractor shall be responsible for documenting installed location of all networked devices. This includes responsibility to provide as-built plan drawing showing device address barcodes corresponding to locations of installed equipment.

2. The installing contractor is also responsible for the following additional documentation to the manufacturer's representative if visualization / graphical floorplan software is provided as part of bid package:

   a. As-Built floor plan drawings showing device address locations required above. All documentation shall remain legible when reproducing/scanning drawing files for electronic submission.
   b. As-Built electrical lighting drawings (reflected ceiling plan) in PDF and CAD format. Architectural floor plans shall be based on as-built conditions.

   1) CAD files shall have layers already turned on/off as desired to be shown in the graphical floorplan background images. The following CAD elements are recommended to be hidden to produce an ideal background graphical image:

      i) Titleblock
      ii) Text- Inclusive of room names and numbers, fixture tags and drawings notes
iii) Fixture wiring and homeruns
iv) Control devices
v) Hatching or poché of light fixtures or architectural elements

2) CAD files shall be of AutoCAD 2013 or earlier. Revit file overall floor plan views shall be exported to AutoCAD 2013.

3.5 FIELD QUALITY CONTROL
A. Inspect each lighting control device for damage and defects.
B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.
C. Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable.
D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.6 ADJUSTING
A. Adjust devices and wall plates to be flush and level.
B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated.
C. Adjust position of directional occupancy sensors and outdoor motion sensors to achieve optimal coverage as required.
D. Adjust time switch settings to achieve desired operation schedule as indicated or as requested by Owner’s representative.
E. Adjust daylighting controls under optimum lighting conditions after all room finishes, furniture, and window treatments have been installed to achieve desired operation as indicated.

3.7 CLEANING
A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.8 SYSTEM STARTUP
A. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed.
   1. For CAT5e wired devices, low voltage network cable testing shall be performed prior to system startup.
   2. System start-up and programming shall include:
      a. Verifying operational communication to all system devices.
      b. Programming the network devices into functional control zones to meet the required sequence of operation.
c. Programming and verifying all sequence of operations.

3. Initial start-up and programming is to occur on-site.

END OF SECTION 26 09 23
SECTION 26 24 13 - SWITCHBOARDS

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 REFERENCES

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
D. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
E. NEMA PB 2 - Deadfront Distribution Switchboards; 2011.
F. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less; 2013.
H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
K. UL 891 - Switchboards; Current Edition, Including All Revisions.
L. UL 977 - Fused Power-Circuit Devices; Current Edition, Including All Revisions.
M. UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.
N. NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

A. See Division 01 for project requirements.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for switchboards, enclosures, overcurrent protective devices, and other installed components and accessories.
C. Shop Drawings: Indicate dimensions, voltage, bus ampcacies, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

1. Include dimensioned plan and elevation views of switchboards and adjacent equipment with all required clearances indicated.
2. Include wiring diagrams showing all factory and field connections.

1.4 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations, configurations, and ratings of switchboards and their components on single line diagrams and plan layouts.

C. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

1. Obtain switchboards through one source from a single manufacturer.

B. Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent equipment and surfaces. Comply with indicated maximum dimensions.

1.6 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.

B. 2021 International Mechanical Code; as Amended by the City of Woodstock.

C. 2021 International Fire Code; as Amended by the City of Woodstock.


G. 2020 National Electrical Code; as Amended by the City of Woodstock.


L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.
1.7 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Receive, inspect, handle, and store switchboards in accordance with manufacturer’s instructions, NECA 400, and NEMA PB 2.1.

C. Store in a clean, dry space having a uniform temperature to prevent condensation (including outdoor switchboards, which are not weatherproof until completely and properly installed). Where necessary, provide temporary enclosure space heaters or temporary power for permanent factory-installed space heaters.

D. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

E. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as required to suit installation.

1.9 MAINTENANCE MATERIALS

A. See Division 01 for project requirements.

B. Furnish two of each different enclosure key.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Base Bid:
   1. Local UL Certified Switchboard Makers containing ‘Eaton’, ‘Square D’ or ‘Siemens’ components:
      a. Chicago Switchboard in Elmhurst, IL.
      b. Power Distribution Equipment Co. in Franklin Park, IL.

B. Alternate Bid No 3:
   1. National UL Certified Switchboard Makers:
      a. Eaton.
      b. Square D.
      c. Siemens.

2.2 SWITCHBOARD

A. Description: Dead-front switchboard assemblies complying with NEMA PB 2, and listed and labeled as complying with UL 891; ratings, configurations and features as indicated on the drawings.

B. Hinged Front Panels: Allow access to circuit breakers, metering, accessory, and blank compartments.

C. Front-Connected Switchboards:
1. **Main Device(s):** Fixed, individually-mounted.
2. **Feeder Devices:** Group-mounted.
3. **Arrangement:** Front accessible only (not rear accessible), front and rear aligned.
4. **Gutter Access:** Bolted covers.

**D. Service Entrance Switchboards:**
1. Listed and labeled as suitable for use as service equipment according to UL 869A.
2. For solidly-grounded wye systems, provide factory-installed main bonding jumper between neutral and ground busses, and removable neutral disconnecting link for testing purposes.
4. **Utility Metering Compartment:** Fabricated compartment and section complying with utility company's requirements. If separate vertical section is required for utility metering, match and align with basic switchboard.
5. **Utility Metering Provisions:** Provide separate barriered compartment complying with Utility Company requirements where indicated or where required by Utility Company. Include hinged sealable door and provisions for Utility Company current transformers (CTs), potential transformers (PTs), or potential taps as required.

**E. Nominal System Voltage:** Indicated on Drawings.

**F. Main-Bus Continuous Amperage:** Indicated on Drawings.

**G. Short Circuit Current Rating, Fully Rated:**
1. Indicated on Drawings or not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 05 73 - Power System Studies.

**H. Selectivity:** Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

**I. Main Devices:** Configure for top or bottom incoming feed as indicated or as required for the installation. Provide separate pull section and/or top-mounted pullbox as indicated or as required to facilitate installation of incoming feed.

**J. Bussing:** Sized in accordance with UL 891 temperature rise requirements.
1. Through bus (horizontal cross bus) to be fully rated through full length of switchboard (non-tapered). Tapered bus is not permitted.
2. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
3. Provide solidly bonded equipment ground bus through full length of switchboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
4. **Phase and Neutral Bus Material:** Hand-drawn copper of 98 percent conductivity with feeder circuit-breaker line connections.
5. **Ground Bus Material:** 1/4-by-2-inch minimum-size, hard-drawn copper, of 98 percent conductivity, equipped with pressure connectors for feeder and branch-circuit ground conductors.
6. **Contact Surface of Buses:** Silver-plated.
7. **Load Terminals:** Insulated, rigidly braced, silver-plated, copper runback bus
extensions equipped with pressure connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full ampere rating of circuit-breaker position.

8. Main Phase Buses, Neutral Buses, and Equipment Ground Buses: Uniform capacity for entire length of switchboard’s main and distribution sections. Provide for future extensions from both ends.

9. Neutral Buses: 100 percent of the ampacity of phase buses, unless otherwise indicated, equipped with pressure connectors for outgoing circuit neutral cables. Bus extensions for busway feeder neutral bus shall be braced.

K. Conductor Terminations: Suitable for use with the conductors materials and sizes as indicated on Drawings.

1. Line Conductor Terminations:
   a. Main and Neutral Lug Material: Hard-drawn copper of 98 percent conductivity, suitable for terminating copper conductors only.
      1) Plating: Silver-Plated.
   b. Main and Neutral Lug Type: Mechanical.

2. Load Conductor Terminations:
   a. Lug Material: Copper, suitable for terminating copper conductors only.
      1) Plating: Silver-plated.
   b. Lug Type:
      1) Provide mechanical lugs unless otherwise indicated.

L. Enclosures:

1. Type 1 - General Purpose.
2. Finish: Manufacturer’s standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.

M. Nameplates:

1. Engraved three-layer laminated plastic, black letters on white background.

N. Comply with NFPA 70E for arc flash labels.

O. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.

1. Where overcurrent protective devices equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.
2. Where accessory ground fault sensing and relaying equipment is used, equip companion overcurrent protective devices with ground-fault shunt trips.
   a. Use zero sequence or residual ground fault detection method unless
b. Provide test panel and field-adjustable ground fault pick-up and delay settings.

c. Provide zone selective interlocking capability where indicated, capable of communicating with other electronic trip circuit breakers and external ground fault sensing systems to control ground fault delay functions for system coordination purposes.

P. Arc Flash Energy-Reducing Maintenance Switching: For circuit breakers rated 1200 A or higher, provide a local accessory switch with status indicator light that permits selection of a maintenance mode with alternate electronic trip unit settings for reduced fault clearing time.

2.3 OVERCURRENT PROTECTIVE DEVICES

A. General:

1. Provide with provisions for locking in the open/off position with a maximum of three (3) padlocks.

2. Ground fault protection shall be provided for solidly grounded wye connected services over 150 volts to ground for all main devices rated 1000 amperes and as indicated on the drawings.

3. Provide circuit breakers with interrupting capacity with interrupting capacity not less than the short circuit current rating indicated.

4. Provide engraved three-layer laminated plastic, black letters on white background to identify each circuit breaker to describe load served.

B. Main Circuit Breaker:

1. Description: Molded case circuit breakers; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.

2. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.

3. NEMA AB 3 with Minimum Interrupting Capacity: Fully rated.

4. Furnish solid state, microprocessor-based, true rms sensing trip units.

a. Provide the following field-adjustable trip response settings:

1) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.

2) Long time delay.

3) Short time pickup and delay.

4) Instantaneous pickup.

5) Ground fault pickup and delay where ground fault protection is indicated.

5. Ground fault protection shall be provided for solidly grounded wye connected services over 150 volts to ground for all main devices rated 1000 amperes and as indicated on the drawings.

6. Provide the following circuit breaker types where indicated:

a. 100 Percent Rated Circuit Breakers: Listed for application within the switchboard where installed at 100 percent of the continuous current rating.

b. Current Limiting Circuit Breakers: Without using fusible elements, designed to limit the let-through energy to a value less than the energy of
a one-half cycle wave of the symmetrical prospective current when operating within its current limiting range.

C. Feeder/Branch Circuit Breakers:

1. **Description:** Molded case circuit breakers; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
2. **Lugs:** Mechanical style, suitable for number, size, trip ratings, and conductor material.
3. **NEMA AB 3 with Minimum Interrupting Capacity:** Fully rated.
4. **For each pole:** furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
   a. **Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 250 amperes and larger.**
5. **Provide the following features and accessories where indicated or where required to complete installation:**
   a. **Shunt Trip:** 120V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
   b. **Pad-Lock Provision:** For locking circuit breaker handle in OFF position.
6. **Application Listing:** Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

2.4 SWITCHBOARD ACCESSORIES

A. **ELECTRONIC METER INSTRUMENT**

1. **Provide** microprocessor-based digital electrical metering system including all instrument transformers, wiring, and connections necessary for measurements specified.
2. **Mounting:** Display and control unit flush or semi-flush mounted in instrument compartment door.
3. **Measured Parameters:**
   a. **Voltage (Volts AC):** Line-to-line, line-to-neutral for each phase.
   b. **Current (Amps):** For each phase and neutral.
   c. **Frequency (Hz).**
   d. **Real power (kW):** For each phase, 3-phase total.
   e. **Reactive power (kVAR):** For each phase, 3-phase total.
   f. **Apparent power (kVA):** For each phase, 3-phase total.
   g. **Power factor.**
   h. **Real energy (kWh).**
   i. **Reactive energy (kVARh).**
   j. **Apparent energy (kVAh).**
   k. **Current demand.**
   l. **Power demand:** Real, reactive, and apparent.
4. **Meter Accuracy:** Plus/minus 1.0 percent.
5. **Features:**
a. Communications Capability: Compatible with system indicated. Provide all accessories necessary for proper interface.
b. KYZ pulse output.
c. Adjustable demand interval.
d. Remote monitoring capability via PC or Building Automation System.


PART 3 - EXECUTION

3.1 PREPARATION

A. Provide concrete housekeeping pad.

3.2 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that the ratings and configurations of the switchboards and associated components are consistent with the indicated requirements.
C. Verify that mounting surfaces are ready to receive switchboards.
D. Verify that conditions are satisfactory for installation prior to starting work.

3.3 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Install switchboards in accordance with NECA 1 (general workmanship), NECA 400, and NEMA PB 2.1.
C. Arrange equipment to provide required clearances and maintenance access.
D. Where switchboard is indicated to be mounted with inaccessible side against wall, provide minimum clearance of 1/2 inch between switchboard and wall.
E. Provide required support and attachment components in accordance with Section 260529 - Hangers and Supports for Electrical Systems.
F. Install switchboards plumb and level.
G. Unless otherwise indicated, mount switchboards on properly sized 4 inch high concrete pad constructed in accordance with Section 033000.
H. Provide grounding and bonding in accordance with Section 260526 - Grounding and Bonding for Electrical Systems.
I. Install all field-installed devices, components, and accessories.
J. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
K. Provide filler plates to cover unused spaces in switchboards.

L. Identify switchboards in accordance with Section 260553 - Identification for Electrical Systems.

M. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

N. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

3.4 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Provide services of a manufacturer’s authorized representative to observe installation and assist in inspection and testing. Include manufacturer’s reports with submittals.

C. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

D. Before energizing switchboard, perform insulation resistance testing in accordance with NECA 400 and NEMA PB 2.1.

E. Inspect and test in accordance with NETA ATS, except Section 4.

F. Perform inspections and tests listed in NETA ATS, Section 7.1.

G. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

H. Molded Case and Insulated Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers. Tests listed as optional are not required.

I. Ground Fault Protection Systems: Test in accordance with manufacturer’s instructions.

J. Perform inspections and tests listed in NETA ATS, Section 7.14. The insulation-resistance test on control wiring listed as optional is not required.

K. Meters: Perform inspections and tests listed in NETA ATS, Section 7.11.2.

L. Instrument Transformers: Perform inspections and tests listed in NETA ATS, Section 7.10. The dielectric withstand tests on primary windings with secondary windings connected to ground listed as optional are not required.

M. Test shunt trips to verify proper operation.

N. Correct deficiencies and replace damaged or defective switchboards or associated components.

O. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.5 ADJUSTING
A. See Division 01 for project requirements.

B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

C. Adjust alignment of switchboard covers and doors.

3.6 CLEANING

A. See Division 01 for project requirements.

B. Clean dirt and debris from switchboard enclosures and components according to manufacturer's instructions.

C. Repair scratched or marred surfaces to match original factory finish.

3.7 PROTECTION

A. Protect installed switchboards from subsequent construction operations.

3.8 SWITCHBOARD DRAWINGS

A. See switchgear elevations and details attached at the end of this section.

END OF SECTION 26 24 13
SECTION 26 24 16 - PANELBOARDS

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:
      1. Distribution panelboards.
      2. Branch circuit panelboards.

1.3 REFERENCES
   A. NECA Standard of Installation (published by the National Electrical Contractors Association).
   C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
   E. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
   F. NEMA PB 1 - Panelboards; 2011.
   G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
   I. UL 67 - Panelboards; Current Edition, Including All Revisions.
   J. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
   L. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS
   A. See Division 01 for project requirements.
B. Product Data: Provide manufacturer’s standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
2. Include wiring diagrams showing all factory and field connections.
3. Clearly indicate short circuit current ratings.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Record actual locations of panelboards and record actual circuiting arrangements in project record documents.

C. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through on source from a single manufacturer.

1.7 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.

B. 2021 International Mechanical Code; as Amended by the City of Woodstock.

C. 2021 International Fire Code; as Amended by the City of Woodstock.


G. 2020 National Electrical Code; as Amended by the City of Woodstock.


L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.9 MAINTENANCE MATERIALS
A. See Division 01 for project requirements.
B. Furnish two of each panelboard key.

PART 2 - PRODUCTS

2.1 DISTRIBUTION PANELBOARDS
A. Manufacturers:
   1. Eaton.
   2. Square D.
   3. Siemens.
B. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
C. Conductor Terminations:
   1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
   2. Main and Neutral Lug Type: Compression.
D. Bussing:
   1. Phase and Neutral Bus Material: Copper.
   2. Ground Bus Material: Copper.
E. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards, 14,000 amperes rms symmetrical for 480 volt panelboards.
F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
G. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1, bolt-on type circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.

H. Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

I. Circuit Breaker Accessories:
1. Trip units and auxiliary switches as indicated on drawings.
2. Branch breaker locking accessories. Where indicated on the drawings provide manufacture accessory to lock breaker in off position. lockout accessory shall be attached to panel or breaker at all times regardless of if breaker is in on or off position.

J. Enclosure:
1. Provide surface or recess mounted enclosures as indicated on Drawings.
2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide metal circuit directory holder mounted on inside of door.
4. Provide manufacturer’s standard finish of gray enamel.

K. Nameplate: Provide identification nameplates indicating panelboard designation. At distribution devices indicate the designation of the equipment followed by the area served.

L. Distribution panelboards shall be fully rated to meet the short circuit current rating shown on the drawings.

M. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.2 BRANCH CIRCUIT PANELBOARDS

A. Manufacturers:
1. Eaton.
2. Square D.
3. Siemens.

B. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

C. Conductor Terminations:
1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
2. Main and Neutral Lug Type: Compression.

D. Bussing:
1. Phase and Neutral Bus Material: Copper.
2. Ground Bus Material: Copper.

E. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards, 14,000 amperes rms symmetrical for 480 volt panelboards.

F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

G. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1, bolt-on type circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.

H. Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

I. Circuit Breaker Accessories:
   1. Trip units and auxiliary switches as indicated on drawings.
   2. Branch breaker locking accessories. Where indicated on the drawings provide manufacture accessory to lock breaker in off position. Lockout accessory shall be attached to panel or breaker at all times regardless of if breaker is in on or off position.

J. Enclosure:
   1. Provide surface or recess mounted enclosures as indicated on Drawings.
   2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
   3. Provide metal circuit directory holder mounted on inside of door.
   4. Provide manufacturer's standard finish of gray enamel.

K. Nameplate: Provide identification nameplates indicating panelboard designation. At distribution devices indicate the designation of the equipment followed by the area served.

L. Panelboards shall be fully rated to meet the short circuit current rating shown on the drawings.

M. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions. Include (6) spare 20A-1P circuit breakers in all panelboards rated 400A and below.

N. Main devices shall be individually mounted and not take up available spaces for branch circuits. Branch mounted main devices are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
C. Install panelboards plumb.
D. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
E. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
F. Mount floor-mounted power distribution panelboards on properly sized 3 inch tall cast-in-place concrete pad.
G. Provide filler plates for unused spaces in panelboards.
H. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
I. Provide typed circuit directory for each existing panelboard modified under contract. New directory shall include all existing loads previously documented in existing directory and new loads. Identify any breakers in existing panels that do not have load conductors terminated at their lugs and mark as spare. Leave spare breakers in the off position.
J. All panelboard schedules shall list the date created and the size and location (source panel and room) of the upstream over current protection for the feeder serving the panel.
K. Install engraved plastic nameplates under the provisions of Section 26 05 53.
L. Provide minimum of (5) spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor. Identify each as SPARE.
M. Ground and bond panelboard enclosure according to Section 26 05 26. Connect equipment ground bars of panels in accordance with NFPA 70.
N. Where circuit breakers serves a hand dryer or other similar motor driven appliance, provide lock out accessory in panelboard to enable lockout of circuit breaker for servicing.

3.2 FIELD QUALITY CONTROL
A. See Division 01 for project requirements.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.
D. Perform switch inspections and tests listed in NETA ATS, Section 7.5.
E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.3 ADJUSTING
A. See Division 01 for project requirements.
B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

C. Adjust alignment of panelboard fronts.

D. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

3.4 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 24 16
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:
   1. Wall Switches.
   2. General Purpose Receptacles.
   3. Ground Fault Type Receptacles.
   4. Wall Plates.

1.3 REFERENCES
A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
B. NECA 130 - Standard for Installing and Maintaining Wiring Devices.
C. NEMA WD 1 - General Requirements for Wiring Devices.
D. NEMA WD 6 - Wiring Device - Dimensional Requirements.
E. UL 20 - General-Use Snap Switches
F. UL 355 - UL Standard for Safety Cord Reels
G. UL 498 - Attachment Plugs and Receptacles
H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices
I. UL 943 - Ground-Fault Circuit-Interrupters
J. NFPA 70 - National Electrical Code.

1.4 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.5 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.6 SUBMITTALS
A. See Division 01 for project requirements.
B. Product Data: Submit manufacturer’s catalog information showing dimensions, colors, and configurations.

PART 2 - PRODUCTS

2.1 WALL SWITCHES
A. Manufacturers:
   1. Pass & Seymour #2621.
   2. Hubbell.
   3. Leviton.
   4. Cooper Wiring Devices.
B. Description: NEMA WD 1, NEMA WD 6, UL 20, Heavy Duty specification grade, AC only general-use snap switch.
C. Body and Handle: Plastic with paddle handle, color to be white.
D. Ratings:
   1. Voltage: 120-277 volts, AC.
E. Toggle Switches: Heavy Duty specification grade, 20A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, three way, or four way as indicated on the drawings.
F. Key-operated Switches: 120-277VAC, 20A, single pole, with factory supplied key in lieu of switch handle similar to Leviton #1221-2L. Provide three way, four way switches where indicated on drawings.
G. Lighted Wall Switches: Heavy Duty specification grade, 20 A, 120/277 V with illuminated standard toggle type switch actuator and maintained contacts; illuminated with load off; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

H. Pilot Light Wall Switches: Heavy Duty specification grade, 20 A, 120/277 V with red illuminated standard toggle type switch actuator and maintained contacts; illuminated with load on; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.2 GENERAL PURPOSE RECEPTACLES

A. Manufacturers:

   1. Pass & Seymour #TR5362.
   2. Leviton.
   3. Hubbell.
   4. Cooper Wiring Devices.

B. Description: NEMA WD 1, UL 498, specification grade, tamper-resistant type receptacle.

C. Device Body: Flush, nylon face, back and side wired, color to be white.

D. Configuration: NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20.

2.3 GROUND FAULT TYPE RECEPTACLES

A. Manufacturers:

   1. Pass & Seymour #2097TR.
   2. Hubbell
   3. Leviton.
   4. Cooper Wiring Devices.

B. Description: NEMA WD 1, UL 498, specification grade, tamper-resistant type, GFCI duplex receptacle.

C. Device Body: Flush, polycarbonate face, back and side wired, color to be white.

D. Configuration: NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20.

F. Self testing per 2015 revisions to UL 943.

G. All receptacles on exterior of building shall be Pass & Seymour #2097TRWRNA, duplex, NEMA 5-20, 125 volt, with ground fault interrupter and mounted in while-in-use, extra-duty, die-cast metallic weatherproof cover in compliance with NEC Article 406.9(B).

2.4 WALL PLATES

A. Decorative Cover Plate: In finished areas for switches and receptacles, provide type 302/304 brushed stainless steel by same manufacturer as device.
B. Cover plate: In unfinished areas provide cadmium plated steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.
B. Verify that outlet boxes are installed at proper height.
C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."
B. Install devices plumb and level.
C. Install switches with OFF position down.
D. Install receptacles with grounding pole on bottom.
E. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
G. Connect wiring devices by wrapping conductor around screw terminal.
H. Use jumbo size plates for outlets installed in masonry walls.
I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
J. Provide ground fault circuit interrupter protection for all receptacles located outdoors, in wet areas and within six feet of a sink.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Install wall switches, lighting control stations, call buttons, volume controls, fire alarm pull stations or other operable control devices 48 inches above finished floor to centerline.
B. Install convenience receptacle 16 inches above finished floor.
C. Install convenience receptacle 6 inches above counter or back splash of counter.
3.5 FIELD QUALITY CONTROL
A. See Division 01 for project requirements.
B. Inspect each wiring device for defects.
C. Operate each wall switch with circuit energized and verify proper operation.
D. Verify that each receptacle device is energized.
E. Test each receptacle device for proper polarity.
F. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING
A. See Division 01 for project requirements.
B. Adjust devices and wall plates to be flush and level.

3.7 CLEANING
A. See Division 01 for project requirements.
B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 26 27 26
SECTION 26 28 19 - ENCLOSED SWITCHES

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:
   1. Enclosed Switches.

1.3 REFERENCE STANDARDS
A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum).
D. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
E. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less.
G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.
H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.
I. UL 98 - Enclosed and Dead-Front Switches.

1.4 SUBMITTALS
A. See Division 01 for project requirements.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

1.5 CLOSEOUT SUBMITTALS
A. See Division 01 for project requirements.
B. Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.

1.6 QUALITY ASSURANCE
A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum ten (10) years experience.

1.7 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
1. Eaton.
2. Square D.
3. Siemens.

2.2 ENCLOSED SWITCHES
A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
B. Provide products listed, classified, and labeled as suitable for the purpose intended.
C. Horsepower Rating: Suitable for connected load.
D. Voltage Rating: Suitable for circuit voltage.
E. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

F. Provide with switch blade contact position that is visible when the cover is open.

G. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
   1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Provide insulated, groundable fully rated solid neutral assembly with a suitable lug for terminating each neutral conductor.

J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
      c. Kitchen Areas: Type 4X, stainless steel.
      d. Other Wet or Damp Indoor Locations: Type 4.
   2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

M. Heavy Duty Switches:
   2. Lug Material: Copper, suitable for terminating copper conductors only.
   3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.
3.2 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Perform work in accordance with NECA 1, NEMA PB 1.1, and NEMA PB 2.1.
C. Provide required supports in accordance with Section 260529.
D. Install enclosed switches plumb.
E. Provide fuses for fusible switches as indicated or as required by equipment manufacturer's recommendations.
F. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.3 FIELD QUALITY CONTROL
A. See Division 01 for project requirements.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Perform inspections and tests listed in NETA ATS, Section 7.5.
D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING
A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING
A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 28 19
SECTION 26 32 13 - ENGINE GENERATORS

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:
1. Packaged engine generator set.
2. Exhaust silencer and fittings.
3. Fuel fittings.
4. Remote control panel.
5. Battery and charger.

1.3 PRODUCTS FURNISHED BUT NOT INSTALLED IN THIS SECTION
A. Division 23 - Heating Piping: Installation of exhaust silencer, and fittings.

1.4 REFERENCE STANDARDS
A. NEMA AB 1 - Molded Case Circuit Breakers.
B. NECA/EGSA 404 - Standard for Installing Generator Sets.
C. NEMA MG 1 - Motors and Generators.
D. NFPA 30 - Flammable and Combustible Liquids Code.
E. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines.
G. UL 1236 - Battery Chargers for Charging Engine-Starter Batteries.
H. UL 2200 - Stationary Engine Generator Assemblies.
I. UL 486A-486B - Wire Connectors.
J. UL 508 - Industrial Control Equipment; Underwriters Laboratories Inc.

1.5 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.
2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.

3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.

4. Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.


B. Interruption of Existing Electrical Service:

1. Arrange timing of shut-down periods of in service panels with Owner. Do not shut down any utility without prior approval.

2. Keep shut-down period to minimum or use intermittent period where directed by Owner.

3. Maintain life-safety systems in full operation in occupied facilities, or provide notice minimum one week in advance.

4. Provide temporary power and wiring as required to maintain life-safety and other systems in operation in areas of building not affected by scope of work.

1.6 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate electrical characteristics and connection requirements. Show plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams.

C. Product Data: Provide data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, and vibration isolators.

D. Test Reports: Indicate results of performance testing.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

F. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

G. Manufacturer's Field Reports: Indicate procedures and findings.

1.7 OPERATION AND MAINTENANCE DATA

A. Operation Data: Include instructions for normal operation.

B. Maintenance Data: Include instructions for routine maintenance requirements, service manuals for engine, oil sampling and analysis for engine wear, and emergency maintenance procedures.

1.8 QUALITY ASSURANCE

A. Perform work in accordance with NFPA 110.
B. Maintain one copy of document on site.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years experience, and with service facilities within 50 miles of Project.

B. Supplier: Authorized distributor of specified manufacturer with minimum five years experience.

1.10 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.

B. 2021 International Mechanical Code; as Amended by the City of Woodstock.

C. 2021 International Fire Code; as Amended by the City of Woodstock.


G. 2020 National Electrical Code; as Amended by the City of Woodstock.


L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Store generator set, components and accessories indoors in clean and dry space with uniform temperature to prevent condensation. Protect generator set, components and accessories from exposure to dirt, fumes, water, corrosive substances, and physical damage.

B. If stored in areas subject to weather, cover generator set, components and accessories to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials. Install electric heating of sufficient wattage to prevent condensation.

C. Deliver and accept generator set, components and accessories in original manufacturer's packaging.
D. Handling: Handle engine generator equipment carefully to prevent physical damage to equipment and components. Do not install damaged equipment. Replace damaged equipment with new.

1.12 MAINTENANCE SERVICE

A. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation for one year from Date of Substantial Completion. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.13 MAINTENANCE MATERIALS

A. Furnish one set of tools required for preventative maintenance of the engine generator system. Package tools in adequately sized metal tool box.

1.14 EXTRA MATERIALS

A. See Division 01 for project requirements.

B. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1. Filters: One (1) set each of lubricating oil, fuel, and combustion-air filters.
   2. Belts: One (1) set of three (3) of each type used.
   3. Tools: One (1) set of special tools that are required for the normal operation and maintenance of unit.
   4. Spark Plugs: One (1) complete set.

1.15 WARRANTY

A. See Division 01 for project requirements.

B. Provide minimum two year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Packaged Engine Generator Set:

   1. Generac.
   2. Caterpillar.

B. Source Limitations: Furnish engine generator sets and associated components and accessories produced by a single manufacturer and obtained from a single supplier.

2.2 PACKAGE ENGINE GENERATOR SYSTEM

A. Provide new engine generator system consisting of all required equipment, sensors, conduit, boxes, wiring, piping, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. System Description:
   2. Configuration: Single packaged engine generator set operated independently
      (not in parallel).

D. Capacities and Characteristics:
   1. Power Output Ratings: Nominal ratings as indicated, with capacity as required to
      operate as a unit as evidenced by records of prototype testing.
   2. Output Connections: As indicated on plans.
   3. Nameplates: For each major system component to identify manufacturer's name
      and address, model and serial number of component.

2.3 ENGINE

A. Type: Water cooled, spark ignited generator set.

B. Rating: Stand-by rated.

C. Fuel System: Natural gas.

D. Engine speed: 1800 rpm.

E. Governor: Adjustable isochronous, with speed sensing to maintain isochronous engine
   speed. Frequency regulation as follows.
   1. Within 0.5 percent, steady state.
   2. Within 1 percent, no load to full load.
   3. Recovery to steady within 2 seconds following sudden load changes.

F. Safety Devices: Engine shutdown on high water temperature, low oil pressure,
   overspeed, and engine overcrank. Limits as selected by manufacturer.

G. Engine Starting: DC starting system with positive engagement, number and voltage of
   starter motors in accordance with manufacturer's instructions. Include remote starting
   control circuit, with MANUAL-OFF-REMOTE selector switch on engine-generator control
   panel.

H. Engine Jacket Heater: Thermal circulation type water heater with integral thermostatic
   control, sized to maintain engine jacket water at 90 degrees F, and suitable for operation
   on 120VAC.

I. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on
   engine-generator-set mounting frame and integral engine-driven coolant pump.
   1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent
      water, with anticorrosion additives as recommended by engine manufacturer.
   2. Size of Radiator: Adequate to contain expansion of total system coolant from
      cold start to 110 percent load condition.
   3. Temperature Control: Self-contained, thermostatic-control valve modulates
      coolant flow automatically to maintain optimum constant coolant temperature as
      recommended by engine manufacturer.
   a. Rating: 50-psig maximum working pressure with coolant at 180 deg F, and noncollapsible under vacuum.
   b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

J. Engine Accessories: Fuel filter, lube oil filter, intake air filter, lube oil cooler. Include fuel pressure gauge, water temperature gauge, and lube oil pressure gauge on engine/generator control panel.

K. Mounting: Provide unit with integral vibration isolators.

2.4 ALTERNATOR

A. Alternator:
   1. 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.

B. Exciter:
   1. Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system.
   2. PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.
   3. Voltage Regulation (with PMG excitation): Solid-state type, separate from exciter, plus/minus 0.5 percent for any constant load from no load to full load.

C. Windings: Two-thirds pitch stator winding.

D. Temperature Rise: Comply with UL 2200.

E. Insulation System: NEMA MG 1, Class H; suitable for alternator temperature rise.

F. Subtransient Reactance: 12 percent, maximum.

G. Enclosure: NEMA MG 1, drip-proof.

H. Total Harmonic Distortion: Not greater than five percent.

I. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

J. Stator-Winding leads brought out to terminal box to permit future reconnection for other voltages.

K. Instrument Transformers mounted within generator enclosure.

L. Voltage Regulator: Include generator mounted volts per hertz exciter regulator to match engine and generator characteristics, with voltage regulation plus or minus 1 percent from no load to full load. Include 3 phase sensing. Include readily accessible manual controls to adjust voltage droop, voltage level (plus or minus 5 percent) and voltage gain.
2.5 ACCESSORIES

A. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed manufacturer's engine backpressure requirements.

1. Exhaust Silencer: Critical type silencer, with muffler companion flanges, flexible stainless steel exhaust fitting, and stainless steel expansion fitting sized sufficiently in accordance with engine manufacturer's instructions to ensure that exhaust back pressure does not exceed the maximum limitations specified. Provide a suitable rain cap.

2. Exhaust Insulation: The silencer and all indoor exhaust piping shall be insulated by the contractor to maintain a surface temperature not to exceed 150 degree F. The insulation shall be installed so that it does not cover or interfere with the functioning of the flexible exhaust fitting.

B. Battery(s):

1. Battery Type: Lead-acid.

2. Battery Capacity: Size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through two complete periods of cranking limiter time-outs without recharging.

3. Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.

C. Battery Tray: Treated for electrolyte resistance, constructed to contain spillage.

D. Battery Charger:

1. Provide dual rate battery charger with automatic float and equalize charging modes and minimum rating of 10 amps; suitable for maintaining the supplied battery(s) at full charge without manual intervention.

2. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, where required by NFPA 110 for Level 1 applications while carrying normal loads.

3. Recognized as complying with UL 1236.

4. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection. Heavy Duty, 100 percent rated, non-fused maintenance disconnect. Match to generator output rating.

5. Operating handle or indicators must have visible indication if switch is in "ON" or "OFF" position.

6. Provide integral DC output ammeter and voltmeter with five percent accuracy.

7. Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.

8. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 5 percent.


10. No on-off switch is allowed on battery charger.
11. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

12. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

E. Line Circuit Breakers: NEMA AB 1, molded case circuit breaker on generator output with integral thermal and instantaneous magnetic trip in each pole, sized in accordance with NFPA 70. Include battery-voltage operated shunt trip, connected to open circuit breaker on engine failure. Unit mount in enclosure to meet NEMA 250, Type 1 requirements. One, or two circuit breaker configurations as indicated on plans.

F. Engine-Generator Control Panel: A NEMA 1 enclosed control panel shall be mounted on the generator set with vibration isolators. The control shall be vibration isolated and prototype tested to verify the durability of all components under the vibration conditions encountered. The generator set mounted control shall include the following features and functions:

1. Three position control switch labeled RUN/OFF/AUTO. In the RUN position the generator set shall automatically start, and accelerate to rated speed and voltage. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.

2. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.

3. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power.

4. Generator Set AC Output Metering: The generator set shall be provided with a metering set with the following features and functions:

   a. Analog AC Voltmeter, dual range, 90 degree scale, 2% accuracy; Analog AC Ammeter, dual range, 90 degree scale, 2% accuracy; Analog Frequency/RPM meter, 45-65 HZ, 1350-1950 RPM, 90 degree scale, +/- 0.6 HZ accuracy.

   b. Seven position phase selector switch with OFF position to allow meter display of current and voltage in each generator phase. When supplied with reconnectable generators, the meter panel shall be reconnectable for the voltage specified.

5. Generator Set Alarm and Status Display: The generator set shall be provided with alarm and status indicating lamps to indicate non-automatic generator status, and existing alarm and shutdown conditions. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on the display panel:

   a. Low oil pressure (alarm)
   b. Low oil pressure (shutdown)
   c. Low coolant temperature (alarm)
   d. High coolant temperature (alarm)
   e. High coolant temperature (shutdown)
   f. Low coolant level (shutdown)
   g. Overcrank (shutdown)
   h. Overspeed (shutdown)
i. Low fuel-daytank (alarm)
j. Ground fault (alarm) (optional--when required by code or specified)
k. In addition, provisions shall be made for indication of two customer-specified alarm or shutdown conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

6. Engine Status Monitoring: The following devices shall be provided on the generator set control:
   a. Engine oil pressure gauge.
   b. Engine coolant temperature gauge.
   c. Engine operation hour gauge.
   d. Number of hours of operation (hours)
   e. Battery voltage (DC volts)

G. Remote Annunciator Panel: Surface mounted panel, field verify exact location with owners representative. Provide alarm horn, and indicators and alarms as follows:
   1. Low coolant temperature alarm
   2. High coolant temperature alarm
   3. Low oil pressure shutdown
   4. Overcrank
   5. Overspeed shutdown
   6. Low fuel level alarm
   7. Charger malfunction generator on load

2.6 GENERATOR SET ENCLOSURE

A. Enclosure Type: Sound attenuating, weather protective. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts is not acceptable. Fasteners to be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.

B. Enclosure Material: Minimum 12 gauge steel framework and 14 gauge steel for panels.

C. Hardware Material: Stainless steel.
   1. Hardware material includes hinges.

D. Finish: Manufacturer's standard color and finish over corrosion-resistant pretreatment and compatible primer.

E. Access Doors: Provide with padlocking provisions.

F. Openings: Designed to prevent bird/rodent entry.
   1. Louvers equipped with bird screen and filter arranged to permit air circulation while excluding exterior dust, birds, and rodents.

G. Sound Attenuating Enclosures, where indicated: Line enclosure with non-hydroscopic, self-extinguishing sound-attenuating material.
H. Utilize an upward discharging radiator hood.

I. Connections to the generator set shall be through seamless flexible connections.

J. Comply with ASCE 7 for wind loads.

K. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.

2. Automatic Dampers: At engine cooling-air inlet and discharge.
   a. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
   b. Dampers shall be spring open-motor close type.
   c. Motorized operators for supply and exhaust dampers shall develop adequate torque to operate the dampers during normal and abnormal conditions such as sleet on dampers.
   d. Voltage of motorized operators shall correspond to the voltage output of the engine generator control panel.

L. Arrange for external connections:

1. To the engine coolant and alternator heaters, and battery charger.
2. Duplex GFI receptacles: one inside the enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of generator sets and auxiliary equipment are consistent with the indicated requirements.

C. Verify that rough-ins for field connections are in the proper locations.

D. Verify that mounting surfaces are ready to receive equipment.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Arrange equipment to provide minimum clearances and required maintenance access.

C. Coordinate with other trades for installation of natural gas piping and air intake/exhaust.

D. Provide grounding and bonding as indicated on plans.

E. Install engine generator remote annunciator panels and wiring to generator control panel.
3.3 FIELD QUALITY CONTROL

A. Provide full load test utilizing portable test bank, if required, for four hours minimum. Simulate power failure including operation of transfer switch, automatic starting cycle, and automatic shutdown and return to normal.

B. Record in 20 minute intervals during four hour test:
   1. Kilowatts.
   2. Amperes.
   3. Voltage.
   4. Coolant temperature.
   5. Room temperature.
   6. Frequency.
   7. Oil pressure.

C. Test alarm and shutdown circuits by simulating conditions.

3.4 MANUFACTURER'S FIELD SERVICES

A. Provide services of a manufacturer's authorized representative to prepare and start systems and perform inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.

3.5 ADJUSTING

A. Adjust generator output voltage and engine speed.

3.6 CLEANING

A. Clean engine and generator surfaces. Replace after testing all oil, and fuel filters.

B. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

C. Clean engine generator set using methods and materials as recommended by the manufacturer.

D. Remove paint splatters and other spots, dirt and debris. Touch up scratches and mars on finish to match original finish.

3.7 DEMONSTRATION

A. Describe loads connected to emergency and standby system and restrictions for future load additions.

B. Simulate power outage by interrupting normal source, and demonstrate that system operates to provide emergency and standby power.

END OF SECTION 26 32 13
SECTION 26 36 13 - ENCLOSED TRANSFER SWITCHES

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 RELATED SECTIONS
A. Section 260553 - Identification for Electrical Systems: Engraved nameplates.
B. Section 263213 - Packaged Engine Generator System: Testing requirements.

1.3 REFERENCES
A. NFPA 70 - National Electrical Code.
B. NECA 1 - Standard for Good Workmanship in Electrical Construction.
C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
D. NEMA ICS 1 - Industrial Control and Systems General Requirements.
I. UL 1008 - Transfer Switch Equipment.

1.4 SUBMITTALS FOR REVIEW
A. See Division 01 for project requirements.
B. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.
C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
1.5 SUBMITTALS FOR CLOSEOUT

A. See Division 01 for project requirements.
B. Operation Data: Instructions for operating equipment under emergency conditions.
C. Maintenance Data: Routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.
B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years experience, and with service facilities within 50 miles of Project.
C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years experience.
D. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for transfer switch.
2. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.

B. Interruption of Existing Electrical Service:
   1. Arrange timing of shut-down periods of in service panels with Owner. Do not shut down any utility without prior approval.
   2. Keep shut-down period to minimum or use intermittent period where directed by Owner.
   3. Maintain life-safety systems in full operation in occupied facilities, or provide notice minimum one week in advance.
   4. Provide temporary power and wiring as required to maintain life-safety and other systems in operation in areas of building not affected by scope of work.

1.9 DELIVERY, STORAGE, AND HANDLING
   A. Receive, inspect, handle, and store transfer switches in accordance with manufacturer's instructions.
   B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
   C. Handle carefully in accordance with manufacturer’s instructions to avoid damage to transfer switch components, enclosure, and finish.

1.10 WARRANTY
   A. Provide minimum one (1) year manufacturer warranty covering repair or replacement due to defective materials or workmanship, including parts and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. Transfer Switches:
      1. Kohler.
      2. Generac.
      3. ASCO.
      4. ABB/GE.
   B. Source Limitations: Furnish transfer switches and accessories produced by a single manufacturer and obtained from a single supplier.

2.2 TRANSFER SWITCHES
   A. Provide complete power transfer system consisting of all required equipment, conduit, boxes, wiring, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
   B. Provide products listed, classified, and labeled as suitable for the purpose intended.
C. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

D. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 degrees C.

E. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

F. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

G. Applications:
   1. Utilize open transition transfer unless otherwise indicated or required.
   2. For transfer of highly inductive loads (e.g. large motors and transformers), utilize open transition transfer with in-phase monitor or delayed transition transfer.
   3. Neutral Switching (Single Phase, Three Wire and Three Phase, Four Wire Systems):
      a. Unless otherwise indicated or required, provide solid (unswitched) neutral.

H. Neutral Terminal: Solid and fully rated.

I. Automatic Transfer Switch:
   1. Transfer Switch Type: Automatic transfer switch.
   2. Transition Configuration: Open-transition (no neutral position).
   3. Voltage: As indicated on the drawings.
   4. Ampere Rating: As indicated on the drawings.
   5. Neutral Configuration: Solid neutral (unswitched), except as indicated.
   6. Load Served: As indicated on the drawings.
   7. Primary Source: As indicated on the drawings.
   8. Alternate Source: As indicated on the drawings.
   9. Comply with NEMA ICS 10 Part 1, and list and label as complying with UL 1008 for the classification of the intended application (e.g. emergency, optional standby).

J. Service Conditions: Provide transfer switches suitable for continuous operation at indicated ratings under the service conditions at the installed location.

K. Short Circuit Current Rating:
   1. Withstand and Closing Rating: Provide transfer switches, when protected by the supply side overcurrent protective devices to be installed, with listed withstand and closing rating not less than the available fault current at the installed location.
   2. Short Time Rating: Where the requirement for selectivity is indicated, provide transfer switches with short time ratings suitable for the maximum short time delay setting of the supply side overcurrent protective device.

L. Automatic Transfer Switches: 
1. Description: Transfer switches with automatically initiated transfer between sources; electrically operated and mechanically held.

2. Control Functions:
   a. Automatic mode.
   b. Test Mode: Simulates failure of primary/normal source.
   c. Voltage and Frequency Sensing:
      1) Undervoltage sensing for each phase of primary/normal source; adjustable dropout/pickup settings.
      2) Undervoltage sensing for alternate/emergency source; adjustable dropout/pickup settings.
      3) Underfrequency sensing for alternate/emergency source; adjustable dropout/pickup settings.
      4) Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
   d. Outputs:
      1) Contacts for engine start/shutdown (except where direct generator communication interface is provided).
      2) Auxiliary contacts; one set(s) for each switch position.
      3) Signal before transfer (load disconnect) contacts; for selective load disconnection prior to transfer.
   e. Adjustable Time Delays:
      1) Engine generator start time delay; delays engine start signal to override momentary primary/normal source failure. Adjustable from zero to six seconds and factory set for one second.
      2) Transfer to alternate/emergency source time delay.
      3) Retransfer to primary/normal source time delay.
      4) Signal before transfer (load disconnect) contact time delay.
      5) Engine generator cooldown time delay; delays engine shutdown following retransfer to primary/normal source to permit generator to run unloaded for cooldown period.
      6) Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
   f. In-Phase Monitor (Open Transition Transfer Switches): Monitors phase angle difference between sources for initiating in-phase transfer.
   g. Engine Exerciser: Provides programmable scheduled exercising of engine generator selectable with or without transfer to load; provides memory retention during power outage. Factory settings are for seven (7) day exercise cycle, twenty (20) minute running period, and five (5) minute cool-down period. Exerciser features include the following:
      1) Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
      2) Push-button programming control with digital display of settings.
3) Integral battery operation of time switch when normal control power is not available.

h. Retransfer to Normal Switch: Bypasses time delays for retransfer to primary/normal source.

i. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Flashing pilot light indicates override status.

3. Status Indications:

a. Connected to alternate/emergency source.
b. Connected to primary/normal source.
c. Alternate/emergency source available.
d. Primary/normal source available.
e. Audible Alarms: Transfer switch shall be equipped with audible alarms that indicate the transfer switch is in other than normal position. A silencing switch is permitted to be installed in the alarm circuit provided an "ALARM SILENCED" indicating light is installed.

4. Alarm Indications for Closed Transition Transfer Switches:

a. Failure to synchronize.
b. Extended source interconnection/transfer switch locked out.

5. Automatic Sequence of Operations:

b. Time Delay To Start Alternate Source Engine Generator: 0 to 6 seconds, adjustable.
c. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.
d. Time Delay Before Transfer to Alternate Power Source: 0 to 5 minutes adjustable.
e. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.
f. Time Delay Before Transfer to Normal Power: 0 to 30 minutes adjustable; bypass time delay in event of alternate source failure.
g. Time Delay Before Engine Shut Down: 0 to 60 minutes, adjustable, of unloaded operation.

2.3 ENCLOSURES

A. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

1. Indoor Clean, Dry Locations: Type 1.
2. Outdoor Locations: Type 3R.

B. Provide lockable door(s) for outdoor locations.

C. Finish: Manufacturer's standard unless otherwise indicated.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of existing conditions prior to beginning work.
B. Verify that surface is suitable for transfer switch installation.
C. Coordinate transfer time delay to accommodate the inrush starting current of load. This contractor to provide necessary programming and time delay relays as required to provide load stepping where indicated.

3.2 INSTALLATION

A. Install per manufacturing instructions.
B. Arrange equipment to provide minimum clearances and required maintenance access.
C. Install transfer switches plumb and level.

3.3 FIELD QUALITY CONTROL

A. Prepare and start system in accordance with manufacturer's instructions.
B. Automatic Transfer Switches:
   1. Inspect and test in accordance with NETA ATS, except Section 4.
   2. Perform inspections and tests listed in NETA ATS, Section 7.22.3. The insulation-resistance tests listed as optional are not required.
C. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

3.4 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.
B. Clean equipment internally, on completion of installation, according to manufacturer's written instructions.

3.5 MANUFACTURER'S FIELD SERVICES

A. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
B. Check out transfer switch connections and operations and place in service.

3.6 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation of transfer switch in normal, and emergency modes.
SECTION 26 43 13 - SURGE PROTECTIVE DEVICES

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:

1. Surge Protective Devices.

1.3 DESCRIPTION

A. This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all AC electrical circuits from the effects of lightning induced currents, substation switching transients and internally generated transients resulting from inductive and/or capacitive load switching.

1.4 REFERENCES


E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.


1.5 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.6 SUBMITTALS

A. See Division 01 for project requirements.
B. The specific item proposed and its area of application shall be indicated on the product specification sheet.
C. Submit certified test results for all models as follows:
   1. UL listing verification:
      a. Submit UL1449 4th Edition Voltage Protection Ratings "VPR".
      b. Submit proof that products are UL listed and labeled by Underwriters Laboratories to UL 1449 4th Edition.

D. Provide warranty statement.

1.7 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.
B. Operation and Maintenance Manuals shall be provided with each SPD shipped.

1.8 WARRANTY

A. Provide minimum ten (10) year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following SPD manufacturers and respective models shall be deemed acceptable, subject to conformance with indicated requirements in this specification and providing spare SPD Module(s):

1. THOR SYSTEMS TSr Series (Service Entrance, Dist. Panel & Panelboard)
2. Current Technologies SL3 Product Series (Service Entrance) & TG3 (Dist. Panel & Panelboard)
3. ASCO 560 Series (Service Entrance) & 510 Series (Dist. Panel & Panelboard)

B. Source Limitations: Furnish surge protective devices produced by a single manufacturer and obtained from a single supplier.

2.2 GENERAL

A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.

B. Protected Modes:

2. Delta Systems: L-G, L-L.

C. UL 1449 Voltage Protection Ratings (VPRs):

1. 208Y/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
2. 240/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
3. 480Y/277V System Voltage: Not more than 1,500 V for L-N, L-G, and N-G modes and 2,000 V for L-L mode.

D. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.

E. Operating Frequency: 47 to 63 Hertz.

F. Integral OCPD for Suppression: The unit shall require the associated switchgear assembly to have an integral OCPD as a means of disconnecting the suppression/filter system for maintenance and/or test purposes without interruption of power to the facility’s distribution system. The OCPD shall be 3-pole for three-phase applications and shall be padlockable.

2.3 MODULAR SURGE PROTECTION FOR SERVICE ENTRANCE/MAIN DISTRIBUTION AND PANELBOARD EQUIPMENT APPLICATIONS

A. Each SPD shall be configured for the voltage as shown on the riser diagram and/or panel schedules. Refer to drawings for locations and quantity(s).
B. Each SPD minimum surge current rating shall be based on the location in electrical distribution system as listed in the table below.

<table>
<thead>
<tr>
<th>Location in Electrical Distribution System</th>
<th>Surge Protection (kA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per Mode</td>
</tr>
<tr>
<td>Service Entrance Switchboard</td>
<td>125</td>
</tr>
<tr>
<td>Distribution Panelboards</td>
<td>80</td>
</tr>
<tr>
<td>Branch Panelboards</td>
<td>50</td>
</tr>
<tr>
<td>Fire Pump Controllers</td>
<td>25</td>
</tr>
</tbody>
</table>

C. Each associated switchboard / panel shall have integral OCPD dedicated for the SPD.

D. Modes of Protection: The SPD system shall provide surge protection in all possible modes (L-N, L-G, L-L, and N-G). Each replaceable module shall provide the uncompromising ability to deliver full surge current rating per mode.

E. SPD modules shall be configured to isolate individual suppression component failures without causing total loss of surge protection in that mode. A spare SPD Module, of each rating and type, shall be provided as part of package for field replacement as required.

F. Connection Method:
   1. Service Entrance: Circuit Breaker Disconnect, 60A, #6AWG Wire.

G. Each individual module shall feature a green LED indicating the individual module has all surge protection devices active. If any module is taken off-line, the green LED will turn off and a red LED will illuminate, providing individual module as well as total system status indication.

H. Diagnostics:
   1. Protection Status Monitoring: Provide indicator lights to report the protection status for each phase.
   3. Remote Status Monitoring: Provide Form C dry type contacts (normally open and normally closed) for remote annunciation of status.
   4. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.

I. The modular SPD shall be provided in a NEMA 4X enclosure, suitable for indoor and/or outdoor applications.

J. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs.
1. Noise Attenuation: Not less than 40 dB at 100 kHz using MIL-STD-220 insertion loss test method.

K. Voltage Protection Ratings: The UL 1449 4th Edition Voltage Protection Ratings "VPR" (6kV, 3000 Amps, 8/20μs waveform) shall not exceed the UL assigned values listed below.

<table>
<thead>
<tr>
<th>Voltage Protection Ratings (VPR) 6kV, 300A, 8/20μs waveform</th>
<th>Voltage Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>208/120V</td>
</tr>
<tr>
<td>Line to Neutral</td>
<td>900V</td>
</tr>
<tr>
<td>Line to Ground</td>
<td>800V</td>
</tr>
<tr>
<td>Neutral to Ground</td>
<td>700V</td>
</tr>
<tr>
<td>Line to Line</td>
<td>1200V</td>
</tr>
<tr>
<td></td>
<td>480/277V</td>
</tr>
<tr>
<td></td>
<td>1200V</td>
</tr>
</tbody>
</table>

L. The SPD shall have a minimum UL 1449 4th Edition Nominal Discharge Current Rating (In) of 10,000 Amps. When used in conjunction with a UL 96A certified Lightning Protection System the (In) rating shall be 20,000 Amps.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.

C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of drawings and manufacturer's instructions.

D. Verify system grounding and bonding is in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Installation shall be in accordance with the NEC Articles 280 & 285.

C. Connect service entrance surge protective device on load side of service disconnect main overcurrent device.

D. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible.
E. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.

F. Disconnect SPD prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPD connected.

G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

H. System shall not require removal and replacement for warranty and/or other repairs. All internal component replacements shall be capable of being completed by a licensed electrician.

3.3 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS Section 7.19.1.

3.4 CONTRACTOR START UP AND REPORTING

A. Verify that electrical wiring installation complies with manufacturer's written installation requirements.

B. Do not energize or connect service entrance equipment, panelboards, control terminals or data terminals to their sources until surge protection devices are installed and connected.

C. Testing: Perform the following field tests and inspections and prepare test reports:

1. After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with manufacturer's requirements.
2. Complete startup checks according to manufacturer's written instructions.
3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.

D. Remove and replace malfunctioning units and retest as specified above.

3.5 CLEANING

A. Repair scratched or marred exterior surfaces to match original factory finish.

B. Do not use compressed air for cleaning.

END OF SECTION 26 43 13
SECTION 26 51 00 - INTERIOR LIGHTING

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:
   1. LED Luminaires.
   2. LED Drivers.
   3. Exit Signs.
   4. Emergency Lighting Units.

1.3 REFERENCES
A. ANSI C78.379 - Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification of Beam Patterns.
C. ANSI C82.4 - Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).
D. NEMA WD 6 - Wiring Devices-Dimensional Requirements.
E. NFPA 70 - National Electrical Code.
H. IESNA LM-80-08 - Measuring Lumen Maintenance of LED Light Sources.

1.4 SUBMITTALS FOR REVIEW
A. See Division 01 for project requirements.
B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
C. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on dimensions, features, performance data, accessories, and finishes.
1.5 QUALITY ASSURANCE
      1. Section C405 - "Electrical Power and Lighting Systems."
      2. Section C408.3 - "Lighting System Functional Testing."

1.6 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS
   A. 2021 International Building Code; as Amended by the City of Woodstock.
   B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
   C. 2021 International Fire Code; as Amended by the City of Woodstock.
   G. 2020 National Electrical Code; as Amended by the City of Woodstock.
   L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 EXTRA PRODUCTS
   A. See Division 01 for project requirements.

1.9 WARRANTY
   A. General Warranty: Special warranty specified in this Section 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. Special Warranties for LED Drivers: Written warranty, executed by manufacturer agreeing to replace LED drivers that fail in materials or workmanship within specified warranty period.
1. Special Warranty Period for LED Drivers: Five years from date of manufacture.

PART 2 - PRODUCTS

2.1 LUMINAIRES
   A. Furnish Products with features, options and accessories as scheduled.

2.2 LED DRIVERS
   A. Minimum Efficiency: 85% at full load.
   B. Minimum Operating Ambient Temperature: -20°C. (-4°F).
   C. Input Voltage: 120-277V (±10%) at 60 Hz.
   D. Integral short circuit, open circuit, and overload protection.
   E. Power Factor: > 0.90.
   F. Total Harmonic Distortion: < 20%.
   G. LED drivers shall have a fully isolated 0-10V control inputs.
   H. All LED drivers shall be capable of 0-10V dimming with linear dimming curve.

2.3 LED LUMINAIRES
   A. LED fixtures shall be designed as a complete unit consisting of a fully factory assembled unit or as a system of manufacture designed components intended for use as a UL listed complete assembly. The use of retrofit kits or lamps in standard fluorescent, HID or incandescent light fixtures is not acceptable.

2.4 EXIT SIGNS
   A. Furnish Products as scheduled.
   B. General Requirements: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
   C. Lamps: LEDs, 50,000 hours minimum rated lamp life.

2.5 EMERGENCY LIGHTING UNITS
   A. Furnish Products as scheduled.
   B. General Requirements: Self-contained units complying with UL 924.
   C. Battery: Sealed, maintenance-free, nickel-cadmium type.
   D. Charger: Fully automatic, solid-state type with sealed transfer relay.
E. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

F. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

G. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

H. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.

I. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Where required install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

B. Support luminaires independent of ceiling framing.

C. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

E. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips. Reuse existing supports if applicable.

F. Install recessed luminaires to permit removal from below.

G. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.

H. Install clips to secure recessed grid-supported luminaires in place.

I. Install wall mounted luminaires, emergency lighting units and exit signs at height as indicated on drawings or as required to serve intended purpose.

J. Install accessories furnished with each luminaire.

K. Connect luminaires, emergency lighting units and exit signs to branch circuit outlets provided under Section 26 05 33 using flexible conduit as indicated.

L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
M. Bond products and metal accessories to branch circuit equipment grounding conductor.

N. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

O. Prior to installation exit sign may require field relocation to accommodate ceiling heights, structure, Fire Inspector requirements or aesthetics, include relocation of within ten feet of location shown.

3.2 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

A. Aim and adjust luminaires as indicated or as required to serve intended purpose.

B. Position exit sign directional arrows as required.

3.4 CLEANING

A. See Division 01 for project requirements.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosures.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

3.5 PROTECTION OF FINISHED WORK

A. See Division 01 for project requirements.

B. Replace failed or faulty ballasts or LED modules or LED drivers at Substantial Completion.

C. Relamp luminaires that have failed lamps at Substantial Completion.

END OF SECTION 26 51 00
SECTION 27 15 00 - DATA COMMUNICATIONS NETWORK CABLEING

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. This section defines the requirements for the installation of the structured cabling system. The system consists of twisted pair cabling, and related hardware. In addition to the basic cable plant requirements, the testing and identification requirements are also defined.

B. Section Includes:
   1. Twisted Pair Cable
   2. Patch Panels
   3. Jacks
   4. Faceplates
   5. Wire Management
   6. Fiber Optic Cable and Interconnecting Devices

1.3 SYSTEM DESCRIPTION

A. Contractor provides all raceways, outlet boxes, cables, termination hardware, patch panels, communication outlets, J-hooks, all supporting hardware, testing, certifications and documentation, and identification as required for a complete information system as specified in this section and indicated on the drawings.

B. Data drop locations will consist of proposed Category 6 cables and proposed Category 6 jacks used for voice and data communications. Jacks are to be installed in multi-port faceplates that are compatible with the surface raceway or backboxes as indicated on the drawings.

C. Drop configurations will primarily consist of:
   1. Data Outlet: Two proposed Category 6 data cables and jacks unless indicated otherwise on drawings.

D. All data cabling is to be routed through accessible ceiling space to IDF closets as indicated on drawings. Data cabling is to be terminated on Category 6 patch panels.

E. Provide cabling and termination equipment between the existing MDF and new IDF closets. Backbone media is to consist of one (1) 6-strand 50/125 micron OM3 multimode fiber optic cable. Route fiber optic cable in 2” inner-duct.

F. All drops, patch panels and wiring blocks are to be labeled with machine printed label strips. No hand lettered labeling will be accepted.
G. Front end data network computers and equipment will be furnished and installed by others.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. A company having at least five (5) years' experience in the installation and testing of the type of system specified, and:

   a. Employing a BICSI Registered Communications Distribution Designer (RCDD).

      1) If personnel of Contractor are not BICSI-trained and -certified, Contractor to submit with bid all necessary credentials and certificates of training for personnel staff that said credentials and certificates are equal to BICSI standards. The project shall be staffed at all times by Installers and Technicians who, in the role of lead crafts persons, will be able to provide leadership and technical resources for the remaining crafts persons on the project.

   b. Supervisors and installers factory certified by manufacturers of products to be installed.

      1) Shall be certified by the manufacturing company(-ies) in all aspects of installation and testing of the products described within the telecommunications systems specifications. Specifically, those manufacturer(s) whose components constitute a component of the structured cabling system(s) installed as part of the voice and data transport systems.

B. Materials and equipment shall be the standard product of a manufacturer regularly engaged in the production of the required type of material or equipment for at least five (5) years shall be the manufacturer's latest design with published properties.

C. Source Limitations: Equipment and materials of the same general type shall be of the same manufacturer throughout the project to provide uniform appearance, operation and maintenance.

D. Equipment and materials shall be without blemish or defect.

E. Listing and Labeling: Provide telecommunication cables, termination hardware, devices and equipment that are listed and labeled by Underwriters Laboratories, Inc. (UL).

F. NEC Compliance: Comply with requirements of NFPA 70, “National Electrical Code” as applicable to telecommunication cables.

G. ANSI/TIA Compliance: Comply with ANSI/TIA standards.

H. The telecommunication cable installer shall be licensed in the State of Illinois.

1.5 REFERENCE STANDARDS

A. NFPA 70: The National Electrical Code
B. ANSI/TIA-568.0-E: Generic Telecommunications Cabling for Customer Premise
C. ANSI/TIA-568.1-E: Commercial Building Telecommunications Cabling
D. ANSI/TIA-568.2-D: Balanced Twisted-Pair Telecommunications Cabling and Components
E. ANSI/TIA-568.3-D, Optical Fiber Cabling And Components Standard
F. ANSI/TIA-568.4-D: Broadband Coaxial Cabling and Components Standard
G. ANSI/TIA-569-E: Telecommunications Pathways and Spaces
H. ANSI/TIA-606-C: Administration Standard for Telecommunications Infrastructure
I. ANSI/TIA-607-D: Generic Telecommunications Bonding and Grounding for Customer Premises
J. ANSI/TIA-1152-A: Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
K. ANSI/TIA-4966: Telecommunications Infrastructure Standard for Educational Facilities

1.6 REGULATORY REQUIREMENTS
A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 SUBMITTALS
A. See Division 01 for project requirements.
B. Prior to Installation:
1. Manufacturer cut sheets, product performance data, and installation instructions for each component including cables, termination hardware, patch panels, identification labels, racks, etc.

C. Project Closeout Submittals:
   1. As-built record drawings including floor plans, telecommunication closet layouts, cable assignment records, cross-connect documentation, cable and termination labeling.
   2. Updated pull schedules reflecting all changes made in the field.
   3. Full documentation of the cable plant test results for proposed Category 6: Must conform to test parameters specified for Level IIIe testers in accordance with ANSI/TIA-1152.
      a. End-to-end continuity.
      b. End-to-end attenuation.
      c. Requirements listed in 3.5 of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Do not deliver or install equipment frames and ladder rack until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and work above ceilings is complete.

C. Receive, handle, and store communications system items and materials at the project site. Materials and items shall be placed so that they are protected from damage and deterioration.

D. Stage materials in a secure area of the project site until installation.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide a complete tested and certified information system including but not limited to:
   1. Category 6 horizontal cabling.
   2. Termination hardware.
   3. Patch equipment.
   4. Supports and mounting hardware.
   5. Identification and labeling.

B. Each information outlet shall be configured as indicated on the drawings.

C. All telecommunications cabling work shall be in accordance with ANSI/TIA standards 568, 569, and 606. Grounding and bonding shall be in accordance with ANSI/TIA-607.

D. End-to-end proposed Category 6 channel must be maintained, including patch panels, jacks and patch cords (of the same manufacturer) and the complete cable installation shall comply with ANSI/TIA-568.
2.2 PATHWAY

A. Comply with ANSI/TIA-569.

B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable. Use to train and manage communications cabling routed on plywood backboard.
   1. Support brackets with cable tie slots for fastening cable ties to brackets.
   2. Lacing bars, spools, and D-rings.
   3. Hook and loop (Velcro) cable ties.

C. Ladder Rack Runway: Used for routing of communications cabling within MDF and IDFs.

D. Conduit and Boxes: Comply with requirements in Section 260533 - Raceway and Boxes. Flexible metal conduit shall not be used.
   1. Boxes shall be double-gang, 2-7/8 inches deep, with single-gang trim plates unless indicated otherwise on drawings.

2.3 CABLE AND CONNECTING HARDWARE

A. Horizontal Cabling
   1. UL-Listed, 100 ohm, 4-pair, unshielded twisted pair (UTP), Category 6, plenum (CMP) rated cable.
      a. Berk-Tek LANmark-6
      b. Mohawk 6 LAN
      c. Hubbell NextSpeed
      d. Panduit TX6

B. Data/Voice Connectors
   1. Modular, 8-position/8-conductor, T568B wired, RJ-45 style, Category 6 jacks. Color as specified on drawings or to match building standard.
      a. Hubbell HXJ6
      b. Panduit
      c. Leviton
   2. Refer to drawings for typical arrangement of telecommunication outlets.

C. Wall Plates
   1. Manufacturers:
      a. Hubbell
      b. Panduit
      c. Leviton
   2. Accepts quantity of modular jacks/inserts indicated on drawings.
   3. Type 302/304 brushed stainless steel to match wiring devices.
   4. For use with snap-in jacks accommodating UTP cables. Jacks shall snap firmly into faceplate frame and be flush with outer plate surface.
5. Provide color-matched snap-in blank insets to fill all unused openings.

D. Patch Panels

1. UL-Listed, modular panel housing multiple-numbered units capable of accepting RJ-45 jacks.
   a. Hubbell
   b. Panduit
   c. Leviton

2. Number of Ports: As required to accommodate quantity of cables indicate on drawings.

3. Capacity: Provide quantity of panels sufficient for number of cables to be terminated plus 25 percent spare.


5. Identification: Permanently imprinted sequentially numbered identification of ports, and clear space above ports for an administrative labeling system to accommodate machine-labeled identification of individual jack ports.

6. Horizontal cable termination on rear of panel. Provide incoming cable strain relief and routing guides on back of panel.

7. Patch Panel ports shall utilize 110 punch down termination on back panel and include retention cap for reach port.

8. Patch Panels shall be constructed of high strength steel with black powder finish.


E. Floor Mounted Rack

1. 19” aluminum ANSI/TIA floor mounted relay rack, for mounting the data cable patch equipment and LAN hubs, rack includes two (2) 6” wide vertical cable channels.
   a. Hubbell #HPW84CMRR19.
   b. Cooper B-Line.
   c. Panduit.

2. Provide racks with:
   a. One multi-receptacle 19” rack mounted power strip, circuit breaker protected, eight (8) spaced power receptacles, and 10 foot cord set. Hubbell #MCCPSS19TS or similar.
   b. Grounding bar with #6AWG insulated equipment grounding conductor bonded to the signal ground bus in the closet.

F. Wall Mounted Rack

1. 19” aluminum ANSI/TIA wall mounted swing gate relay rack for mounting the data and voice cable patch equipment and LAN hubs.
   b. Cooper B-Line.
   c. Panduit.

2. Provide racks with:
a. One (1) multi-receptacle 19” rack mounted power strip, circuit breaker protected, eight spaced power receptacles, Hubbell #MCCPSS19TS or similar, and 10 foot cord set.

b. Grounding bar with #6AWG insulated equipment grounding conductor bonded to the signal ground bus in the closet.

G. Backboards

1. Provide 3/4” thick fire rated plywood backboard in closet as indicated. Paint with two (2) coats of fire retarding white paint before mounting any hardware.

2.4 FIBER OPTIC CABLE AND INTERCONNECTING DEVICES

A. Fiber Optic Backbone Cable

1. Manufacturers:

   a. Belden
   b. Berk-Tek
   c. CommScope
   d. Corning Optical Communications
   e. General Cable Technologies Corporation
   f. Mohawk
   g. Superior Essex

2. Description: Tight buffered, non-conductive fiber optic cable complying with TIA-568-C.3, TIA-598-D, ICEA S-83-596 and listed as complying with UL 444 and UL 1651 for the following types:

   a. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

B. Cable Type: 6-Strand, Multimode, laser-optimized 50/125 um (OM3) complying with TIA-492AAAC-B.

C. Cable Jacket:

2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-568-C.3.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

D. Fiber Optic Interconnecting Devices

1. Manufacturers:

   a. Belden
   b. Corning Optical Communications
   c. Hubbell Premise Wiring
   d. Leviton
   e. Ortronics / Legrand
   f. Panduit Corporation
   g. CommScope

3. Fiber Optic Termination Housing: Rack-mounted, with multi-numbered, duplex connector insert adapter panels holding fiber optic strand connectors.
   a. General: Housing shall be modular in design with management clips that provide slack storage to comply with optical fiber bend radius and the recommended slack storage length, and be equipped with pullout tray for front access to fiber terminations and rear of adapter panels. Housing shall have:
      1) Administrative labeling system for identification of individual fiber ports.
      2) Anchor points and strain relief for entry of optical cable into the unit.
      3) Recessed adapter panel face, with front-mounted door that is secured with a keyed cylinder lock, clasp, or tab insert.
   b. Size: Three (3) rack units high; sized to accommodate at least six (6) adapter panels.
   c. Adapter Panels: Housing to be fitted out with adapter panels, each able to accommodate six (6) duplex LC-style quick-connect couplers (12 strands total), with blank adapter panels at all unused housing panel slots. Provide in quantity required to accommodate quantity of fiber optic cables served by housing.

4. Fiber Patch Cords: Owner to provide all patch cords.

5. Optical Cable Connectors:
   a. Field-terminated, quick-connect, simplex and duplex, Type LC connectors.
   b. Connector Performance: 500 mating cycles, when tested in accordance with TIA-455-21.
   c. Maximum Attenuation/Insertion Loss: 0.3 dB.
   d. Color: Aqua.

PART 3 - EXECUTION

3.1 DEMOLITION

A. For a renovation project in an existing building, demo and remove back to source, all abandoned communications wiring serving communications outlets and devices within the area of work. Coordinate work to not disrupt communications services to areas outside the project's area of work as may be served by components and communications infrastructure located within the project's area of work.

B. Remove and dispose of termination devices, panels, housings, outlets, mounting frames, cable supports, wire management, etc. abandoned as a result of demolition work, except where indicated for re-use and except where remove of said components would disrupt communication infrastructure and communications systems service to areas outside project's area of work.
3.2 EXAMINATION

A. Materials shall be examined for damage on receiving the materials. Reject any materials that are damaged.

B. Examine all materials before installation. Reject and materials that are damaged.

C. Examine elements and surfaces to which materials will be installed.

D. Prepare wall penetrations and verify that penetrations of rated fire walls are made using products labeled for type of wall penetrated.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Horizontal cable run above the suspended ceiling shall be installed in a neat and organized manner, straight and plumb and shall be when possible routed above accessible corridor areas. Cable drops to wall outlets shall be run in the conduit stub-ups.

B. Horizontal cables shall be run above the suspended ceilings and shall be supported through Category 6 J-hooks installed at a maximum spacing of 5 foot on-center. Coordinate cable installation with other ceiling installations including HVAC ducts, electrical fixtures and conduits, and sprinkler piping. Cable bundle droop shall not exceed 8" between supports.

C. Voice and data cables shall be run in continuous uninterrupted sections from origin to termination with no splices or couplers.

D. The Contractor shall provide conduit sleeves through all walls and floors to accommodate information cables. All sleeves shall be sized for 50 percent future growth. Fire seal sleeves using approved materials and methods once cables are pulled.

E. Cables shall be bundled by means of Velcro. Zip-ties are unacceptable.

F. Tie wraps utilized above ceilings shall be snug without deforming cable jacket.

G. The length of each Horizontal cable run shall not exceed 295 feet. Horizontal cable is defined as that length of cable from the back of the workstation outlet to the back of the Patch Panel or connecting block in the telecommunications closet. Horizontal cable shall be a continuous run of cable with no splices, bridges, or other discontinuities.

H. Maintain cable twist-rate at all termination points. The amount of cable untwist shall be no more than 1/2". Do not strip back the cable jacket any more than is necessary to terminate the individual conductors, 1 inch maximum.

I. All 110 connections shall be installed using a single 110 punch down tool and all terminations shall be trimmed flush with connector blocks.

J. Leave enough cable (approximately 12 inches at the outlet & 48 inches at the rack) to allow easy termination of the cable.

K. Cables shall not be tie wrapped to electrical conduits or other system piping.
L. D-rings shall be provided and mounted to route the horizontal cables at the backboard locations (& in chase locations as designated on the Drawings).

M. No communication or data circuit shall be run in the same conduit or raceway with power conductor.

N. Cable routing shall avoid locations of high RFI/EMI radiation or adverse environmental conditions. Maintain minimum separations of: 6" from fluorescent light fixtures, 12" from open power conductors, 4'-0" from transformers and other high voltage devices.

O. The horizontal structured cable plant shall be grounded and bonded in accordance with ANSI/TIA-607.

P. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.

Q. Do not over-cinch or crush cables.

R. Do not exceed manufacturer's recommended cable pull tension.

S. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.

3.4 IDENTIFICATION

A. Provide identification labels at all cables, outlets and termination patch panels in accordance with the contract drawings and specifications.

B. Cable labels shall be typed and covered with clear plastic laminate and shall be attached at 6" from the closet termination end and at 2"-4" from the outlet location end. Cable labels shall also be provided at the point where they entered as a bundle into the surface non-metallic raceway system.

C. Engraved nameplates shall be provided at the racks to identify patch panels.

D. Preprinted transparent adhesive labels shall be provided at all communication outlets identifying the outlet designation and the port assignments.

E. Submit samples of all identification labels, for Owners approval prior to installation.

3.5 TESTING AND CERTIFICATION

A. Copper UTP Cable Tests: Upon completion of the installation and termination of all communication cables, the horizontal cabling plant shall be end-to-end performance tested and certified for the specified cable classification categories and shall be performed in accordance with ANSI/TIA-568.

1. All installed cables shall be permanent link tested with Level IIIe testers in accordance with ANSI/TIA-568 for the following parameters:

   a. Wire map.
   b. Length.
   c. Propagation Delay.
   d. Delay Skew.
   e. DC Loop Resistance.
f. DC Resistance Unbalance within a pair.
g. DC Resistance Unbalance between pairs.
h. Insertion Loss.
i. NEXT (Near-End Crosstalk).
j. PS NEXT (Power Sum Near-End Crosstalk).
k. ACR-N (Attenuation to Crosstalk Ratio Near-End).
l. PS ACR-N (Power Sum Attenuation to Crosstalk Ratio Near-End).
m. ACR-F (Attenuation to Crosstalk Ratio Far-End).
n. PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End).
o. Return Loss.
p. TCL (Transverse Conversion Loss).
q. ELTCTL (Equal Level Transverse Conversion Transfer Loss).
r. PS ANEXT (Power Sum Alien Near-End Crosstalk).
s. Average PS ANEXT (Average Power Sum Alien Near-End Crosstalk).
t. PS AACR-F (Power Sum Alien Attenuation to Crosstalk Ratio Far-End).
u. Average PS AACR-F (Average Power Sum Alien Attenuation to Crosstalk Ratio Far-End).

2. Installed cables shall be field-tested and pass the test requirements and analysis. A star (**) passing shall not be considered acceptable. Any Permanent Link that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected Permanent Link meets performance requirements. The final and passing result of the tests for all Permanent Links shall be provided in the test results documentation as part of close-out requirements.

B. Fiber Optic Cable Tests: Each fiber strand shall be tested after final termination has been completed.

1. Optical Fiber Test Instruments:
   a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

2. Optical Time Domain Reflectometry Tests: After terminating optical fiber cables, one individual fiber from each backbone cable installed shall be tested using an optical time domain reflectometer (OTDR). Perform OTDR testing in accordance with manufacturer’s recommended test procedures. Test to determine the installed length, continuity, and OTDR-based attenuation measurement. Provide test report identifying backbone cable identification and indicating corresponding values from tests.

3. Link End-to-End Attenuation Tests: Perform optical fiber end-to-end link tests according to ANSI/TIA-568.
   a. Multimode backbone link measurements: Test at 850 or 1300 nm in both directions according to ANSI/TIA-526-14, Method B, One Reference Jumper.
   b. Attenuation test results shall be less than that calculated according to equation in ANSI/TIA-568.
c. These readings must not be higher than the "Optimal Attenuation Loss (OAL)". The OAL will be calculated using the manufacturer's factory certified test results, (db/km) adjusted for the actual installed lengths (dBs) plus the manufacturer's best published attenuation losses for the connector on this project and/or splice installed on this project (0.25dB for Connectors and 0.10dB for splices).

d. Link End-to-End Attenuation Test reports shall include:

1) Cable identification and Strand numbers.
2) The OAL value for each link.
3) The theoretical maximum attenuation value, per ANSI/TIA-568, for each link.
4) Tested values for attenuation.

C. Test results shall be included as part of closeout documents.

D. End-to-end cabling will be considered defective if it does not pass tests and inspections. Correct failures and retest to demonstrate compliance; otherwise, remove and replace with new components and retest to demonstration compliance with requirements.

3.6 CABLE SCHEDULES

A. The installing contractor shall coordinate with school district representative the exact termination arrangement and identification/administration.

END OF SECTION 27 15 00
SECTION 27 53 13 - WIRELESS CLOCK SYSTEM

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:
   1. Master clock;
   2. Repeaters
   3. Secondary analog clock;
   5. Elapsed timer control panel;

1.3 REFERENCE STANDARDS
A. Federal Communications Division (FCC)
B. National Fire Protection Association (NFPA).
   1. NFPA 70E-[2012], Standard for Electrical safety in the Workplace.
C. Underwriter's Laboratories (UL).
   1. UL

1.4 ADMINISTRATIVE REQUIREMENTS
A. Co-ordination: Co-ordinate work of this Section with communications and electronics work and with work of other trades for proper time and sequence to avoid construction delays.
B. Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and [one week] before starting work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer’s written installation instructions.
   1. Comply with Section 01 31 19 Project Meetings and co-ordinate with other similar pre installation meetings.
   2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
   3. Ensure meeting agenda includes review of methods and procedures related to insulation installation including co-ordination with related work.
   4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.
1.5 SUBMITTALS

A. Make submittals in accordance with Contract Conditions and Section 01 33 00 Submittal Procedures.

B. Product Data: Submit product data including manufacturer's literature for clock system materials and accessories, indicating compliance with specified requirements and material characteristics.
   1. Submit list on clock system manufacturer's letterhead of materials and accessories to be incorporated into Work.
   2. Include product name.
   3. Include preparation instructions and recommendations, installation methods, and storage and handling requirements.
   4. Include contact information for manufacturer and their representative for this Project.

C. Shop Drawings: Submit shop drawings with information as follows:
   1. Diagram of proposed system showing system platform appliance, communication pathway, and schedule of individual device locations.
   2. Indicate integration with the Owner's network and servers. Include line diagram of network relationships.
   3. Show system power requirements.

D. Subcontractor Experience: Submit verification of communication and electronics subcontractor's experience.

E. Manufacturer's Authorization: Submit verification of communication and electronics subcontractor's authorization from clock system manufacturer to perform Work of this section.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Supply maintenance data for clock system for incorporation into manual specified in Section 01 78 00 Closeout Submittals.

B. Record Documentation: In accordance with Section 01 78 00 Closeout Submittals.
   1. List materials used in clock system work.
   2. Warranty: Submit warranty documents specified.

1.7 QUALITY ASSURANCE

A. Communications and Electronics Subcontractor Quality Assurance:
   1. Work experience of [3] years minimum with work similar to work of this Section.
   2. Manufacturer's authorization to perform work of this section.

B. Supplier's Accreditation: Use only suppliers accredited by clock system manufacturer.

C. Supplier's Maintenance Requirements:
   1. Ensure local supplier has adequate facility for storage of spare parts for clock system.
1.8 DELIVERY STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver material in accordance with Section 01 61 00 Common Product Requirements.
   2. Deliver materials and accessories in clock system manufacture’s original packaging with identification labels intact and to suit project.
   3. Ensure clock system materials are not exposed to moisture during delivery.
   4. Replace damaged clock system materials.

B. Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to fumes and harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in original packaging until installed.

1.9 WARRANTY

A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

B. Manufacturer’s warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty document executed by authorized company official. Manufacturer’s warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURER


2.2 SYSTEM REQUIREMENTS

A. Ensure clock system components are designed to operate as a wireless clock system and as part of complete system including “fail-proof” design to ensure power interruption does not cause system failure.

B. Ensure system can work in conjunction with existing wiring.

C. Ensure system synchronizes all clocks and devices to each other.

D. Ensure system does not require FCC licensing.

E. Ensure system works in 915-928 MHz frequency range.

F. Ensure system uses frequency-hopping technology.

G. Ensure system is capable of correcting clocks immediately upon receipt of wireless signal.
   1. Analog and digital clocks automatically correct themselves on receipt of wireless signal.
2. Include built-in closed-loop system in analog clocks capable of allowing clocks to detect position of hands and bring clocks to correct time even if clocks are manually altered.
3. Ensure analog clocks have diagnostic function capable of allowing user to view how long since clock received wireless signal.
4. Ensure analog clocks are capable of functional tests of electronics and gears.

H. Ensure each individual product is bench tested at manufacturer's facility.
   1. Random testing is unacceptable.

I. Ensure each product is designed, assembled and tested in the United States of America.

J. Basis of Design: Sapling Inc., Wireless Clock System.

2.3 MASTER CLOCK

A. Master Clock Type 1: To UL and cUL 863.

1. Ensure master clock includes 10 pre-programmed (S)NTP backup addresses.
2. Ensure master clock is capable of receiving (S)NTP time signal via Ethernet.
3. Ensure master clock is capable of receiving digital signals through RS485 connection.
4. Ensure master clock is capable of correcting secondary clocks for Daylight Saving Time
5. Ensure master clock is capable of customizing Daylight Saving Time, in the event of international use or a change in government regulations.
6. Ensure master clock is capable of outputting RS485 signals.
7. Ensure master clock has two clock circuits capable of outputting signals including:
   a. 59 minute correction;
   b. 58 minute correction;
   c. National Time or Rauland correction;
   d. Once a day pulse;
   e. Rauland digital correction.

8. Communications Interface: Ensure master clock system is capable of being programmed remotely through online interface accessible through LAN and compatible with Microsoft Internet Explorer and Mozilla Firefox web browsers.
   a. Ensure interface includes functions as follows:
      1) Allow users to schedule bells and other events;
      2) Display features;
      3) Show IP settings;
      4) Show other master clock settings;
      5) Set time and date;
      6) Download or upload master clock settings;
      7) Configure e-mail alerts for various instances.

9. Display: Two row, 20 character LED and backlit LED display and 2 x 8 inch rubber keypad for operator programming.

10. Allow for programming of master clock through 16 button rubber tactile keypad or built-in web interface.
11. Ensure master clock can contain up to 800 events.
12. Ensure master clock can contain up to 255 schedule changes.
   a. Transmitter: Capable of transmitting data to SAL(G) wireless analog and SBL(G) wireless digital clocks, and receiving signal from (S)NTP time server
   b. Automatic bi-annual Daylight Savings Time changes.
14. Ensure master clock has internal battery to save settings and operate internal real-time clock for 10 years.
15. Input Voltage: 85 V AC - 264 V AC, 50/60 Hz.

2.4 REPEATERS

A. Network Repeater: Capable of receiving time signal through TCP/IP from master clock and compliant with FCC, Part 15.
   1. Input Voltage: 85 V AC - 264 V AC, 50/60 Hz.;
   2. Input: RJ45;
   3. Input source: Master clock;
   4. RF power output: 30 dBM (1 Watt);
   5. Frequency hopping technology;
   6. Mounting: Wall mount;
   7. Housing: 11 x 8 x 17 inches black smooth surface metal enclosure with 7 inch antennae.

   1. Input Voltage: 85 V AC - 264 V AC, 50/60 Hz.;
   2. Input: RS485. Sapling Wireless Communications;
   3. Input source: Master clock or Secondary Sapling Wireless Clock;
   4. RF power output: 30 dBM (1 Watt);
   5. Frequency hopping technology;
   6. Mounting: Wall mount;
   7. Housing: 11 x 8 x 17 inches black smooth surface metal enclosure.

2.5 SECONDARY CLOCKS

A. Analog Clocks: To UL and cUL 863, designed for wireless system with fully automatic plug and play capability.
   1. Ensure secondary clock is capable of receiving wireless signals from master clock.
   2. Ensure each secondary clock works as an RF signal repeater, establishing a Mesh Network.
   3. Clock display: 12 hour white face with black numbers.
      a. Size: Round 12 or 16 inches.
4. Ensure analog secondary clock is capable of receiving Sapling wireless signals every two (2) or four (4) hours for battery models and every minute for 24 V / 110V model.

5. Materials:
   a. Dial: Polystyrene
   b. Case: Shallow profile, smooth surface SlimLine ABS

6. Hand tolerance:
   a. Hour and minute hands: ±1/4 minute.
   b. Second hand: ± 1/2 minute.

7. Power Requirements: Battery operated.
   a. Batteries: 2 "D" cell batteries.
      1) Basis for design: Duracell Procell "D" Cell batteries.

8. Basis of design: Sapling Inc., SAL(G) Series Wireless Round Clock

2.6 ACCESSORIES
   A. Signal and Control Circuits: Manufacturer's recommended stranded, single conductors or twisted pair cable.
   B. Data Circuits: Category 5 minimum, twisted pair cable.

2.7 SOURCE QUALITY CONTROL
   A. Ensure clock system components and accessories are supplied or approved in writing by single manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS
   A. Use only installers with [3] years minimum experience with work similar to work of this Section.
   B. Ensure all clock system components are installed by single communications and electronics subcontractor.

3.2 EXAMINATION
   A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for clock system installation in accordance with manufacturer's written recommendations.
      1. Visually inspect substrate in presence of Consultant.
      2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
      3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
B. Start of clock system installation indicates installer’s acceptance of substrate installation conditions.

3.3 INSTALLATION

A. Install wireless clock system in accordance with manufacturer’s written recommendations and in accordance with NFPA 70E.

B. Integrate clock system with Owner's electrical and communications network.

C. Install wiring in accordance with requirements of local Authority Having Jurisdiction.

D. Conceal wiring except in unfinished spaces and as approved in writing by Consultant.

E. Install clocks only after painting and other finish work is completed in each room.

F. Install clocks and other devices square and plumb.

3.4 SYSTEM STARTUP

A. At completion of installation and before final acceptance, turn on equipment and ensure equipment is operating properly, and clock system devices and components are functioning.

B. Evaluate and test each device in clock system on room-by-room basis using factory-trained technicians.

1. Fix or replace devices which fail test or are functioning incorrectly.
2. Submit evaluation and report showing results of room-by-room tests and overall system compliance within 3 days of testing being carried out.

3.5 DEMONSTRATION AND TRAINING

A. Arrange system demonstration and training session for Owner’s operation and maintenance personnel.


B. Break down system demonstration and training session into logical segments for Owner’s operations and maintenance personnel.

C. Train Owner’s maintenance personnel in procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of clock system.

3.6 PROTECTION

A. Protect installed products and accessories from damage during construction.

B. Repair damage to adjacent materials caused by clock system installation.

END OF SECTION 27 53 13
SECTION 28 31 00 - FIRE DETECTION AND ALARM

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:

1. Fire-alarm control unit.
3. System smoke detectors.
8. Addressable interface device.
9. UL Listed Fire Radio OR Digital alarm communicator transmitter.

1.3 SYSTEM DESCRIPTION

A. The fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

B. The fire alarm system shall be manufactured by an ISO 9001:2008 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

C. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof). It's acceptable for peripheral devices to be manufactured outside of the U.S. by a division of the U.S. based parent company.

D. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

E. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final checkout and to ensure the systems integrity.

F. Coordinate requirements with local Authority Having Jurisdiction and dispatch for fire alarm monitoring. Include all labor and materials required for remote monitoring via approved means and methods.

1.4 SUBMITTALS

A. See Division 01 for project requirements.
B. The Contractor shall purchase no equipment for the system specified herein until the Owner/Engineer has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications.

C. Submittals shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the Contract Documents. In addition the Contractor shall provide specific notation on each Shop Drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to the Owner/Engineer.
2. Shop Drawings shall be prepared by persons with the following qualifications:
   a. Trained and certified by manufacturer in fire-alarm system design.
   b. NICET-certified fire-alarm technician, Level III minimum
   c. Product Data: Product Data sheets with the printed logo or trademark of the manufacturer of all equipment. Indicated in the documentation shall be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Owner.

D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fire Alarm distributor's employed personnel shall be trained and certified by manufacturer on the make and model of the fire alarm control panel specified for this Project.

B. Additional Installer Qualifications: Installation shall be by personnel certified by NICET as a technician who has been certified at Level II in the sub-field of Fire Alarm Systems Layout.
C. Project Manager Qualifications: Installation shall be supervised by personnel certified by NICET as Fire Alarm System Layout Level IV Technician (SET), an NFPA Certified Fire Protection Specialist (CFPS) or an NCEES accredited Licensed Fire Protection Engineer (FPE).

D. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single distributor and manufacturer. Components shall be compatible with, and operate as a fully U.L. listed extension of a U.L. 864 listed fire alarm control system.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.

F. Fire Alarm Distributor Qualifications:

1. Contractor shall utilize an Illinois Licensed Private Alarm Contractor Agency that is an authorized, independently owned Manufacturers representative of the specified fire alarm equipment manufacturer.

2. Fire Alarm Distributor shall be a full service entity qualified to provide the engineering for the technical submittal, furnishing of the equipment, commissioning, testing and inspection services outlined herein including intelligibility testing and capable of providing full repair service to any fire alarm system and/or provide fire alarm system installation and design including, but not limited to, the following minimum requirements:

   a. Qualified Fire Alarm Service Company with employees who meet the criteria defined by NFPA 72 for the qualifications of both System Designers and System Installers to include the requirements of the Authorities Having Jurisdiction (AHJ).

   b. Certified Fire Alarm Service Inspectors with employees of the entity who are certified in Fire Protection Engineering Technology by the National Institute for Certification in Engineering Technologies (N.I.C.E.T.) in FIRE ALARM SYSTEMS - LEVEL II, minimum.

3. Distributor shall be a registered Illinois legal entity (Corporation, Partnership, Professional Corporation or Limited Liability Company) in Good Standing with the Secretary of State of Illinois.

4. Distributor entity shall hold a valid Illinois Private Alarm Contractor Agency License. Sub-contractors or licensed individual Private Alarm Contractors DO NOT meet this requirement.

5. Distributor entity shall be qualified by the AHJ, including the Illinois Department of Professional Regulation to provide engineering design services for a fire alarm system as evidenced by holding an Illinois Registered Professional Design Firm license. Sub-contractors or individually licensed individual Registered Architects, Professional or Structural Engineers DO NOT meet this requirement.

6. All service employees of the entity shall have a valid Illinois Permanent Employee Registration Card (P.E.R.C.).

1.6 GUARANTY

A. The fire alarm control panel, voice panels and any head-end equipment shall have a manufacturer's warranty of a minimum of 3 years.
1.7 POST CONTRACT MAINTENANCE

A. Complete maintenance and repair service for the fire detection system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the guaranty.

B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, required tests, and list pricing for any replacement products included on the bill of materials, along with the list pricing for products not on the bill of materials; if test and inspection rates are different than full service rates the bid/proposal shall include pricing for all levels for a minimum period of five (5) years. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.

C. Include also a quote for unscheduled maintenance/repairs, including hourly rates for technicians trained on this equipment, and response travel costs for each year of the maintenance period. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.

1.8 APPLICABLE STANDARDS AND SPECIFICATIONS

A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

B. National Fire Protection Association (NFPA) - USA:
   No. 12 Extinguishing Systems (low and high)
   No. 12A Halon 1301 Extinguishing Systems
   No. 13 Sprinkler Systems
   No. 15 Water Spray Systems
   No. 16 Foam / Water Deluge and Spray Systems
   No. 17 Dry Chemical Extinguishing Systems
   No. 17A Wet Chemical Extinguishing Systems
   No. 2001 Clean Agent Extinguishing Systems
   No. 72 National Fire Alarm Code
   No. 70 National Electric Code
   No. 90A Air Conditioning Systems
   No. 101 Life Safety Code

C. Underwriters Laboratories Inc. (UL) - USA:
   No. 268 Smoke Detectors for Fire Protective Signaling Systems
   No. 864 Control Units for Fire Protective Signaling Systems
   No. 2572 Mass Notification Systems
   No. 217 Smoke Detectors, Single and Multiple Station
   No. 228 Door Closers - Holders for Fire Protective Signaling Systems
   No. 268A Smoke Detectors for Duct Applications
   No. 521 Heat Detectors for Fire Protective Signaling Systems
   No. 464 Audible Signaling Appliances
   No. 38 Manually Actuated Signaling Boxes
   No. 1481 Power Supplies for Fire Protective Signaling Systems
   No. 346 Waterflow Indicators for Fire Protective Signaling Systems
   No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
   No. 1971 Visual Notification Appliances
   No. 2017 Standard for General-Purpose Signaling Devices and Systems
   No. 60950 Safety of Information Technology Equipment
D. Local and State Building Codes.
E. All requirements of the Authority Having Jurisdiction (AHJ).

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Smoke Detectors, heat detectors, monitor modules and control modules: Quantity equal to 2% percent of amount of each type installed, but no fewer than 2 unit of each type.
   2. Keys: Ten extra set for access to locked and tamperproof components.
   3. Audible and Visual Notification Appliances: 2% of each type installed.

1.10 REGULATORY REQUIREMENTS

A. 2021 International Building Code; as Amended by the City of Woodstock.
B. 2021 International Mechanical Code; as Amended by the City of Woodstock.
C. 2021 International Fire Code; as Amended by the City of Woodstock.
G. 2020 National Electrical Code; as Amended by the City of Woodstock.
L. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.11 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to be included in emergency, operation, and maintenance manuals. Include the following:
   1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
   2. Provide "Record of Completion Documents" according to NFPA72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
   3. Record copy of site-specific software database file, hardcopy print-out and CD, with password for delivery to the owner. Proprietary system/service companies will not be acceptable.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA72 article of the same name and include the following:
   a. Frequency of testing of installed components.
   b. Frequency of inspection of installed components.
   c. Requirements and recommendations related to results of maintenance.
   d. Manufacturer's user training manuals.
   e. Manufacturer's required maintenance related to system warranty requirements.
   f. Abbreviated operating instructions for mounting at fire-alarm control unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All panels and peripheral devices shall be of the standard product of a single manufacturer by one of the following:
   2. Gamewell-FCI.
   3. Silent Knight.

B. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling fire alarm system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

C. The Contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply, with the requirements of these Specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.

D. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building Owner. All specified operational features must be met without exception.

E. All control panel assemblies and connected (new) field appliances shall be provided by the same System Supplier, and shall be designed and tested to ensure that the system operates as specified. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.

F. Upon completion of the project the Owner shall be provided with a hard copy printout of the system software database and an electronic version of the system program and database with all required passwords.

G. That equipment proposed to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:
   1. A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
2. The supplier of alternate equipment shall furnish evidence that the proposed alternate system performance is equal to or superior than the system operation stated in the specification. Such evidence shall be submitted to the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.

3. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written, and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.

4. The supplier of alternate equipment shall submit a list from the alternate manufacture on the manufactures letterhead indicating the names and addresses of all authorized suppliers in the area. Proprietary products will not be considered.

5. The acceptability of any alternate proposed system shall be the sole decision of the Owner or his authorized representative.

H. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component. The catalog numbers specified under this section are those of Notifier by Honeywell and shall constitute the type, product quality, material and desired operating features.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices:

2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Duct smoke detectors.
6. Verified automatic alarm operation of smoke detectors.
7. Automatic sprinkler system water flow.
8. Heat detectors in elevator shaft and pit.
9. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Activate the audible and visual notification appliances
2. Identify alarm at fire-alarm control unit and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. Recall elevators to primary or alternate recall floors.
8. Activate emergency shutoffs for gas and fuel supplies.
9. Record events in the system memory.
C. Supervisory signal initiation shall be by one or more of the following devices and actions:
   1. Valve supervisory switch.
   2. Low-air-pressure switch of a dry-pipe sprinkler system.
   3. Elevator shunt-trip supervision.

D. System trouble signal initiation shall be by one or more of the following devices and actions:
   1. Open circuits, shorts, and grounds in designated circuits.
   2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
   3. Loss of primary power at fire-alarm control unit.
   4. Ground or a single break in fire-alarm control unit internal circuits.
   5. Abnormal ac voltage at fire-alarm control unit.
   7. Failure of battery charging.
   8. Abnormal position of any switch at fire-alarm control unit or annunciator.
   9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
   10. Low-air-pressure switch operation on a dry-pipe or pre-action sprinkler system.

E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators.

2.3 MAIN FIRE ALARM CONTROL PANEL OR NETWORK NODE

A. Main FACP or network node shall be a NOTIFIER Model NFS-320 and shall contain a microprocessor based Central Processing Unit (CPU) and power supply in an economical space saving single board design. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system controlled devices.

2.4 SYSTEM CAPACITY AND GENERAL OPERATION

A. The FACP shall be capable of communicating on Noti-Fire-Net over a Local Area Network (LAN) or Wide Area Network (WAN) utilizing a peer-to-peer, inherently regenerative communication format and protocol. The network shall support communication speed up to 100 Mb and support up to 200 panels / nodes per network.

B. Each network node shall provide, or be capable of 318 intelligent / addressable devices per SLC loop.

C. The Notification Appliance Circuits shall be programmable to Synchronize with System Sensor, Gentex and Wheelock Notification Appliances.

D. The system shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display (LCD), individual color coded system status LEDs, and an alphanumeric keypad with easy touch rubber keys for the field programming and control of the fire and gas detection system.

E. The system shall be programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes.
F. The system shall allow the programming of any input to activate any output or group of outputs. Systems that have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or require a laptop personal computer are not considered suitable substitutes.

G. The FACP shall support up to 20 logic equations, including "and," "or," and "not," or time delay equations to be used for advanced programming. Logic equations shall require the use of a PC with a software utility designed for programming.

H. The FACP or each network node shall provide the following features:
   1. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.
   2. Detector sensitivity test, meeting requirements of NFPA 72.
   3. Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
   4. Up to nine sensitivity levels for alarm, selected by detector. The alarm level range shall be 0.5 to 2.35 percent per foot for photoelectric detectors, 0.5 to 2.5 percent per foot for ionization detectors, 0.5 to 4.0 percent per foot for acclimate detectors and 1.0 to 4.0 percent per foot for multi-criteria (IntelliQuad and IntelliQuad PLUS) detectors. The system shall also support sensitive advanced detection laser detectors with an alarm level range of .02 percent per foot to 2.0 percent per foot. The system shall also include up to nine levels of Prealarm, selected by detector, to indicate impending alarms to maintenance personnel.
   5. The ability to display or print system reports.
   6. Alarm verification, with counters and a trouble indication to alert maintenance personnel when a detector enters verification 20 times.

I. PAS presignal, meeting NFPA 72 requirements.
   1. Self optimizing pre-alarm for advanced fire warning, which allows each detector to learn its particular environment and set its prealarm level to just above normal peaks.
   2. Cross zoning with the capability of counting: two detectors in alarm, two software zones in alarm, or one smoke detector and one thermal detector.
   3. Control-by-time for non-fire operations, with holiday schedules.
   4. Day / night automatic adjustment of detector sensitivity.
   5. Device blink control for sleeping areas.

J. The FACP shall be capable of coding main panel node notification circuits in March Time (120 PPM), Temporal (NFPA 72 A-2-2.2.2), and California Code. Panel notification circuits (NAC 1, 2, 3 and 4) shall also support Two-Stage operation, Canadian Dual Stage (3 minutes) and Canadian Dual Stage (5 minutes). Two stage operation shall allow 20 Pulses Per Minute (PPM) on alarm and 120 PPM after 5 minutes or when a second device activates. Canadian Dual stage is the same as Two-Stage except will only switch to second stage by activation of Drill Switch 3 or 5 minute timer. The panel shall also provide a coding option that will synchronize specific strobe lights designed to accept a specific "sync pulse."
K. For flexibility and to ensure program validity, an optional Windows(TM) based program utility shall be available. This program shall be used to off-line program the system with batch upload/download, and have the ability to upgrade the manufacturers (FLASH) system code changes. This program shall also have a verification utility, which scans the program files, identifying possible errors. It shall also have the ability to compare old program files to new ones, identifying differences in the two files to allow complete testing of any system operating changes. This shall be in compliance with the NFPA 72 requirements for testing after system modification.

1. This utility shall provide the ability to create and print NFPA style Test and Inspection reports
2. This utility shall provide the ability to create and print Device Maintenance information

L. The 80-character display keypad shall be an easy to use QWERTY type keypad, similar to a PC keyboard. This shall be part of the standard system and have the capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.

M. Each FACP or FACP network node shall support one SLC. Each SLC interface shall provide power to and communicate with up to 159 intelligent detectors (ionization, photoelectric, multi-criteria, thermal, laser, fire/CO) and 159 intelligent modules (monitor, control, relay, releasing) for a loop capacity of 318 devices. SLC shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.

N. CPU shall receive analog information from all intelligent detectors to be processed to determine whether normal, alarm, pre-alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector’s desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

2.5 SERIAL INTERFACES

A. The system shall include two serial EIA-232 interfaces. Each interface shall be a means of connecting UL Listed Information Technology Equipment (ITE) peripherals.

B. EIA-232 interface shall be used to connect an UL-Listed 40 or 80 column printer. Printers that are not UL-Listed are not considered acceptable substitutes.

C. The system shall include an EIA-485 port for the serial connection of optional annunciators and remote LCD displays.

D. The EIA-485 interface may be used for network connection to a proprietary-receiving unit.

2.6 SPECIFIC SYSTEM OPERATIONS

A. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any or all addressable intelligent detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window and have a minimum of 9 levels.
B. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification delay shall be programmable from 0 to 60 seconds and each detector shall be able to be selected for verification. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

C. Point Disable: Any addressable device may be enabled or disabled through the system keypad.

D. Point Read: The system shall be able to display or print the following point status diagnostic functions:
   1. Device status
   2. Device type
   3. Custom device label
   4. View analog detector values
   5. Device zone assignments

E. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 800 events. Up to 200 events shall be dedicated to alarm and the remaining events are general purpose. Systems that do not have dedicated alarm storage, where events are overridden by non-alarm type events, are not suitable substitutes. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.

F. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.

G. Pre-Alarm Function: The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.

H. Software Zones: The FACP shall support 142 independent programmable software zones.

I. Multiple agent releasing zones: The system shall support up to 10 releasing zones to protect against 10 independent hazards. Releasing zones shall provide up to three cross-zone and four abort options to satisfy any local jurisdiction requirements.

J. Mass Notification Override: The system shall be UL 2572 listed for Mass Notification and shall be capable, based on the Risk Analysis, of being programmed so that Mass Notification/Emergency Communications events take precedence over fire alarm events.
K. The fire alarm control panel shall include a walk test feature. It shall include the ability to
test initiating device circuits and notification appliance circuits from the field without
returning to the panel to reset the system. Operation shall be as follows:

1. Alarming an initiating device shall activate programmed outputs, which are
selected to participate in walk test, for 3 seconds.
2. Introducing a trouble into the initiating device shall activate the programmed
outputs for 8 seconds.
3. All devices tested in walk test shall be recorded in the history buffer.

2.7 COMMUNICATORS

A. The UDACT shall be compact in size, mounting in a standard module position of the fire
alarm control cabinet. Optionally, the UDACT shall have the ability for remote mounting,
up to 6,000 feet from the fire alarm control panel. The wire connections between the
UDACT and the control panel shall be supervised with one pair for power and one pair for
multiplexed communication of overall system status. Systems that utilize relay contact
closures are not acceptable.

B. The UDACT shall include connections for dual telephone lines (with voltage detect), per
UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events
up to three different telephone numbers.

C. The UDACT shall be capable of transmitting events in 4+2, SIA, and Contact ID.

D. Communication shall include vital system status such as:

1. Independent Zone (Alarm, trouble, non-alarm, supervisory)
2. Independent Addressable Device Status
3. AC (Mains) Power Loss
4. Low Battery and Earth Fault
5. System Off Normal
6. 12 and 24 Hour Test Signal
7. Abnormal Test Signal (per UL requirements)
8. EIA-485 Communications Failure
9. Phone Line Failure

E. The UDACT shall support independent zone/point reporting when used in the Contact ID
format. In this format the UDACT shall support transmission of up to 3,064 points. This
enables the central station to have exact details concerning the origin of the fire or
response emergency.

F. The UDACT shall be capable of being programmed with the same programming utility as
the host FACP, and saved, edited and uploaded and downloaded using the utility.
UDACT shall be capable of being programmed online or offline. The programming utility
shall also support upgrading UDACT operating firmware.

G. The UDACT shall be capable of generating Central Station reports providing detailed
programming information for each point along with the central station point address.

H. An IP or IP/GSM Communicator option shall be available to interface to the UDACT and
be capable of transmitting signals over the internet/intranet or Cellular (GSM) network to a
compatible receiver.

I. Smoke Control Annunciator
1. On/Auto/Off switches and status indicators (LEDs) shall be provided for monitoring and manual control of each fan, damper, HVAC control unit, stairwell pressurization fan, and smoke exhaust fan. To ensure compliance the units supplied shall meet the following UL categories: UUKL, PAZX, UDTZ, QVAX as well as the requirements of NFPA 90A, HVAC, and NFPA 92A & 92B, Smoke Control. The control System shall be field programmable for either 90A operation or 92A/B operation to allow for future use and system expansion.

2. The OFF LED shall be Yellow, the ON LED shall be green, the Trouble/Fault LED shall be Amber/Orange for each switch. The Trouble/Fault indicator shall indicate a trouble in the control and/or monitor points associated with that switch. In addition, each group of eight switches shall have two LEDs and one momentary switch which allow the following functions: An Amber LED to indicate an OFF-NORMAL switch position, in the ON or OFF position; A Green LED to indicate ALL AUTO switch position; A Local Acknowledge/Lamp Test momentary switch.

3. Each switch shall have the capability to monitor and control two addressable inputs and two addressable outputs. In all modes, the ON and OFF indicators shall continuously follow the device status not the switch position. Positive feedback shall be employed to verify correct operation of the device being controlled. Systems that indicate on/off/auto by physical switch position only are not acceptable.

4. All HVAC switches (i.e., limit switches, vane switches, etc.) shall be provided and installed by the HVAC contractor.

5. It shall be possible to meet the requirements mentioned above utilizing wall mounted custom graphic.

2.8 SYSTEM COMPONENTS & ADDRESSABLE DEVICES

A. General

1. Addressable devices shall use simple to install and maintain decade, decimal address switches. Devices shall be capable of being set to an address in a range of 001 to 159.

2. Addressable devices, which use a binary-coded address setting method, such as a DIP-switch, are not an allowable substitute. Addressable devices that require the address be programmed using a special tool or programming utility are not an allowable substitute.

3. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits.

4. Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash green under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady red illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.

5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. The panel on a time-of-day basis shall automatically adjust sensitivity.

6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72.
7. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Base options shall include a sounder base with a built-in (local) sounder rated at 85 DBA minimum, a relay base and an isolator base designed for Style 7 applications. The system shall also support an intelligent programmable sounder base, the programmable sounder base shall be capable of providing multiple tones based on programming and at a minimum be capable of providing a Temp-4 tone for CO (Carbon Monoxide) activation and a Temp-3 tone for fire activations and be capable of being synchronized with other programmable sounder bases and common area notification appliances; 85 DBA minimum.

8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).

10. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.

11. Addressable devices shall store an internal identifying code that the control panel shall use to identify the type of device.

12. A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.

13. Addressable modules shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box. An optional surface mount Lexan enclosure shall be available.

14. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status; NOTIFIER model # NBG-12LX. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key. The key used to reset the pull station must be the same as the key used to lock and unlock the FACP door(s).

15. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.

16. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

B. Intelligent Photoelectric Smoke Detector: The intelligent photoelectric smoke detector shall be NOTIFIER model # FSP-851 and shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

C. Intelligent VIEW® Laser Photo Smoke Detector: The intelligent laser photo smoke detector shall be a spot type detector, NOTIFIER model # FSL-751, that incorporates an extremely bright laser diode and an integral lens that focuses the light beam to a very small volume near a receiving photo sensor. The scattering of smoke particles shall activate the photo sensor.
1. The laser detector shall have conductive plastic so that dust accumulation is reduced significantly.
2. The intelligent laser photo detector shall have nine sensitivity levels and be sensitive to a minimum obscuration of 0.02 percent per foot.
3. The laser detector shall not require expensive conduit, special fittings or PVC pipe.
4. The intelligent laser photo detector shall support standard, relay, isolator and sounder detector bases.
5. The laser photo detector shall not require other cleaning requirements than those listed in NFPA 72. Replacement, refurbishment or specialized cleaning of the detector head shall not be required.
6. The laser photo detector shall include two bicolor LEDs that flash green in normal operation and turn on steady red in alarm.

D. Intelligent Ionization Smoke Detector: The intelligent ionization smoke detector shall be NOTIFIER model # FSI-851 and shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.

E. Intelligent Multi Criteria Acclimating Detector: The intelligent multi-criteria Acclimate® Plus™ detector shall be an addressable device, NOTIFIER model # FAPT-851, that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability to adapt to its environment by utilizing a built-in microprocessor to determine its environment and choose the appropriate sensing settings. The detector design shall allow a wide sensitivity window, no less than 1 to 4% per foot obscuration. This detector shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.

1. The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).
2. The intelligent multi criteria detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.

F. Intelligent Thermal Detectors: The intelligent thermal detectors shall be NOTIFIER FST-series addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. A high heat thermal detector rated at 190 degrees Fahrenheit shall also be available. The thermal detectors shall connect via two wires to the fire alarm control panel signaling line circuit.

G. Intelligent Duct Smoke Detector: The smoke detector housing shall accommodate an intelligent photoelectric detector that provides continuous analog monitoring and alarm verification from the panel. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system. The Intelligent Duct Smoke Detector shall support the installation of addressable Photoelectric detector capable or being tested remotely. The Intelligent Duct Detector housing shall be model # DNR(W) and the remote test capable photoelectric smoke detector shall be NOTIFIER model # FSP-851R.
H. IntelliQuad™ Advanced Multi-Criteria Intelligent Detector

1. Intelligent multi-criteria fire detector shall be a NOTIFIER model number FSC-851. Smoke detector shall be an addressable intelligent multi-criteria smoke detector. The detector shall be comprised of four sensing elements, including a photoelectric (light-scattering) particulate sensor, an electrochemical carbon monoxide (CO) sensor, a daylight-filtered infrared sensor and solid state thermal sensor(s) rated at 135°F (57.2°C). The device shall be able to indicate distinct smoke and heat alarms.

2. The intelligent multi-criteria detection device shall include the ability to combine the signal of the photoelectric signal with other sensing elements in an effort to react quickly in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a nuisance alarm condition. The product design shall be capable of selecting the appropriate sensitivity levels based on the environment type chosen by user in which it is installed (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes.

3. The detector shall be capable of automatically adjusting its sensitivity by means of drift compensation and smoothing algorithms. The detector shall be capable of automatically adjusting its sensitivity by means of drift compensation and smoothing algorithms. The device shall provide unique signals to indicate when 20% of the drift range is remaining, when 100% of drift range is used, and when there is a chamber fault to show unit requires maintenance.

4. The detector shall indicate CO trouble conditions including 6 months of sensor life remaining and sensor life has expired. The detector shall indicate a combined signal for any of the following: low chamber trouble, thermistor trouble, CO self test failure, IR self test failure, and freeze warning.

5. The detectors shall provide address-setting means on the detector head using rotary switches. Because of the possibility of installation error, systems that use binary jumpers or DIP switches to set the detector address are not acceptable. The detectors shall also store an internal identifying code that the control panel shall use to identify the type of detector. Systems that require a special programmer to set the detector address (including temporary connection at the panel) are labor intensive and not acceptable. Each detector occupies any one of at least 99 possible addresses on the signaling line circuit (SLC) loop. It responds to regular polls from the system and reports its type and status.

6. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a switch) or initiated remotely on command from the control panel. There are three test methods: functional magnet, smoke entry aerosol, or direct heat method.

7. The detectors shall provide two LEDs to provide 360° visibility. The LEDs are placed into steady red illumination by the control panel indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED, sounder base, and/or relay base (optional accessories). The external remote alarm can be interconnected to other sounder or relay bases for activating all devices in a space via a single alarming unit.

8. Two LEDs on the sensor are controlled by the panel to indicate sensor status. Coded signals, transmitted from the panel, can cause the LEDs to blink, latch on, or latch off. Refer to the control panel technical documentation for sensor LED status operation and expected delay to alarm.
9. The detectors shall be ceiling-mount and shall be plug-in mounted into a twist-lock base. These detectors shall be constructed of off-white UV resistant polymer and shall be detachable from the mounting base to simplify installation, service and maintenance. Mounting base wiring connections shall be made by means of SEMS screws. The detector shall allow pre-wiring of the base and the head shall be a plug-in type. Mounting base shall be mounted on junction box which is at least 1.5 inches (3.81 cm) deep. Mounting base shall be available to mount to standard junction boxes. Suitable boxes include:

   a. 4.0" (10.16 cm) square box with and without plaster ring.
   b. 4.0" (10.16 cm) octagonal box.
   c. 3.5" (8.89 cm) octagonal box.
   d. Single-gang box.

10. Meets Agency Standards

   a. ANSI/UL 268 -Smoke Detectors for Fire Alarm Signaling Systems
   b. CAN/ULC-S529- Smoke Detectors for Fire Alarm Systems
   c. FM 3230-3250- Smoke Actuated Detectors for Automatic Fire Alarm Signaling

I. IntelliQuad™ PLUS Advanced Multi-Criteria Intelligent Fire/CO Detector

1. Advanced Multi-Criteria Fire/CO detector shall be NOTIFIER model # FCO-851 and shall be an addressable advanced multi-criteria smoke detector with a separate signal for carbon monoxide (CO) detection per UL 2075 standards.

2. The detector shall be comprised of four sensing elements, including a photoelectric (light-scattering) particulate sensor, an electrochemical CO sensor, a daylight-filtered infrared (IR) sensor and solid state thermal sensor(s) rated at 135°F (57.2°C). The device shall be able to indicate distinct smoke and heat alarms.

3. The advanced multi-criteria detection device shall include the ability to combine the signal of the photoelectric signal with other sensing elements in order to react quickly in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a nuisance alarm condition. The detector shall be capable of selecting the appropriate sensitivity levels based on the environment type (office, manufacturing, kitchen, etc.) in which it is installed, and then have the ability to automatically change the setting as the environment changes.

4. The CO detector component shall be capable of a functional gas test using a canned test agent to test the functionality of the CO sensing cell.

5. The detector shall be capable of automatically adjusting its sensitivity by means of drift compensation and smoothing algorithms. The device shall provide unique signals to indicate when 20 percent of the drift range is remaining, when 100 percent of drift range is used, and when there is a chamber fault to show the unit requires maintenance.

6. The detector shall indicate CO trouble conditions, including six months of sensor life remaining and sensor life has expired. The detector shall indicate a combined signal for any of the following: low chamber trouble, thermistor trouble, CO self test failure, IR self test failure, and freeze warning.
7. The detector shall provide address-setting means on the detector head using rotary switches. Because of the possibility of installation error, systems that use binary jumpers or DIP switches to set the detector address are not acceptable. The detector shall also store an internal identifying code that the control panel shall use to identify the type of detector. Systems that require a special programmer to set the detector address (including temporary connection at the panel) are labor intensive and not acceptable. Each detector occupies any one of at least 159 possible addresses on the signaling line circuit (SLC) loop. It responds to regular polls from the system and reports its type and status.

8. The detector shall provide a test means whereby it will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a switch) or initiated remotely on command from the control panel. There shall be four test methods: functional magnet, smoke entry aerosol, carbon monoxide aerosol or direct heat method.

9. The detector shall provide two LEDs to provide 360° visibility. The LEDs shall be placed into steady red illumination by the control panel indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED. The detector must be capable of connecting to a sounder base that provides both temporal 3 and temporal 4 patterns for fire and CO alarm.

10. Two LEDs on the sensor shall be controlled by the panel to indicate sensor status. Coded signals, transmitted from the panel, shall cause the LEDs to blink, latch on, or latch off. Refer to the control panel technical documentation for sensor LED status operation and expected delay to alarm.

11. The detector shall be plug-in mounted into a twist-lock base. The detector shall be constructed of off-white, UV-resistant polymer and shall be detachable from the mounting base to simplify installation, service and maintenance. Mounting base wiring connections shall be made by means of SEMS screws. The detector shall allow pre-wiring of the base and the head shall be a plug-in type. The mounting base shall be mounted on a junction box that is at least 1.5 inches (3.81 cm) deep. The mounting base shall be available to mount to standard junction boxes. Suitable boxes include:

   a. 4.0" (10.16 cm) square box with and without plaster ring.
   b. 4.0" (10.16 cm) octagonal box.
   c. 3.5" (8.89 cm) octagonal box.
   d. Single-gang box.
   e. Double-gang box

12. Meets Agency Standards

   a. ANSI/UL 268 -Smoke Detectors for Fire Alarm Signaling Systems
   b. CAN/ULC-S529- Smoke Detectors for Fire Alarm Systems
   c. FM 3230-3250- Smoke Actuated Detectors for Automatic Fire Alarm Signaling
   d. UL 2075 - Gas and Vapor Detector and Sensors - Systems Connected
J. Intelligent Addressable Aspiration Detector: The intelligent aspiration detector shall be NOTIFIER model # FSA-8000 an addressable aspiration detector that communicates directly with the fire alarm control panel via the SLC communication protocol, no modules or high level interfaces shall be required. The fire alarm control panel shall support up to thirty one intelligent aspiration detectors per SLC loop. The aspiration detector shall have dual source (blue LED and infra-red laser) optical smoke detection for a wide range of fire detection with enhanced immunity to nuisance particulates. The FACP shall be capable of monitoring and annunciating up to five smoke event thresholds and eleven trouble conditions. Each event threshold shall be capable of being assigned a discrete type ID at the FACP.

K. Intelligent Addressable Reflected Beam Detector: The intelligent single-ended reflected beam smoke detector shall connect with two wires to the fire alarm control panel signaling line circuit (SLC). The detectors shall consist of a transmitter/receiver unit and a reflector and shall send data to the panel representing the analog level of smoke density. The detector shall be capable of being tested remotely via a keyswitch; NOTIFIER model # FSB-200. Model # FSB-200S shall be equipped with an integral sensitivity test feature.

L. Addressable Dry Contact Monitor Module
1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs. The addressable monitor module shall be NOTIFIER model # FMM-1 (Class A or B) or FMM-101 (Class B)
2. The IDC zone shall be suitable for Style D/Class A or Style B/Class B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
3. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.
4. For multiple dry contact monitoring a module shall be available that provides 10 Style B or 5 Style D input circuits; NOTIFIER model # XP10-M.

M. Two Wire Detector Monitor Module
1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device); NOTIFIER model # FZM-1.
2. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
3. For multiple 2-wire smoke detector circuit monitoring a module shall be available that provides 6 Style B/Class A or 3 Style D/Class B input circuits; NOTIFIER model # XP6-MA.

N. Addressable Control Module
1. Addressable control modules shall be provided to supervise and control the operation of one conventional circuit of compatible Notification Appliances, 24 VDC powered, polarized audio/visual notification appliances; NOTIFIER model # FCM-1
2. The control module NAC may be wired for Style Z or Style Y (Class A/B) with a current rating of 2 Amps for Style Z and 3 Amps for Style Y;
3. Audio/visual power shall be provided by a separate supervised circuit from the main fire alarm control panel or from a supervised UL listed remote supply.

4. For multiple circuit control a module shall be available that provides 6 Style Y (Class B) or 3 Style Z (Class A) control circuits; NOTIFIER model # XP6-C.

O. Addressable Releasing Control Module

1. An addressable FlashScan releasing module shall be available to supervise and control compatible releasing agent solenoids; NOTIFIER model # FCM-1-REL.
2. The module shall operate on a redundant protocol for added protection.
3. The module shall be configurable for Style Z or Style Y (Class A/B) and support one 24 volt or two 12 volt solenoids.

P. Addressable Relay Module:

1. Addressable Relay Modules shall be available for HVAC control and other network building functions; NOTIFIER model # FRM-1.
2. The module shall provide two form C relays rated at up to 3 Amps resistive and up to 2.0 Amps inductive.
3. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary devices energize at the same time on the same pair of wires.
4. For multiple relay control a module shall be available that provides 6 programmable Form-C relays; NOTIFIER model # XP6-R.

Q. Addressable Two-In / Two-Out Monitor/Relay Module:

1. An addressable Two-In / Two-Out module shall be available; NOTIFIER model #FDRM-1.
2. The two-in/two-out module shall provide two Class B/Style B dry-contact input circuits and two independent Form-C relays rated at up to 3 Amps resistive and up to 2.0 Amps inductive.

R. Isolator Module: Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building; NOTIFIER model # ISO-X.

1. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
2. The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
3. The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

2.9 INSPECTION BAR CODES

A. Inspection bar codes shall be installed on all initiating devices, annunciators, control panels and power supplies.
B. Inspection bar codes used by the system must utilize Code 3 of 9 or other approved format, and contain a minimum of eight (8) digits that comprise a unique serial identifier within the Web-based Reporting System. There shall be no duplication of serial numbers. Serial number shall be printed below the bar code for identification purposes.

C. Inspection bar codes shall be limited in size to no more than 2” (5cm) in width, and 3/8” (2 cm), in height and shall include a Mylar® or other protective coating to protect the bar code from fading due to sunlight or exposure.

D. Inspection bar codes shall be installed on each device in such a manner as to require that scanning of the bar code take place no further than 12” from the device during inspection.

2.10 WIRE AND CABLE

A. UL Listed and Plenum Rated.

B. Signaling Line Circuits - Annunciator Data: Twisted pair, not less than No. 18AWG or as recommended by the manufacturer.

C. Signaling Line Circuits - Intelligent Loop: Twisted pair, not less than No. 18AWG or as recommended by the manufacturer.

1. Circuit Integrity Cable: Provide as required to meet NFPA or Local Code requirements.
2. CI Cable shall meet National Electrical Code, power limited fire alarm service.

D. Notification Appliance Circuits -

1. Horn and Visual. 12AWG THHN or FPLP or as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.

C. Smoke- or Heat-Detector Spacing:

3. Smooth ceiling spacing shall not exceed 30 feet.
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A or Appendix B in NFPA 72.
5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
D. Addressable System Type Single-Station Smoke Detectors and Smoke/CO Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all rooms of the dwelling unit to sound.

E. Wall Mounted Notification Appliance Devices: Install between 80 and 96 inches on the wall depending upon the device type. The installer shall consult his or her onsite copy of the required edition of NFPA 72 for guidance, their copy of the approved submittal bearing the Architect and/or Owner Representatives review and approval stamp and confirm this location mounting height with the Architect prior to installing any conduit, boxes or raceway systems.

F. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor with an addressable photoelectric smoke sensor located on the wall or ceiling above the panel in accordance with NFPA 72, regardless of whether or not it is actually shown on a floor plan drawing or riser diagram.

G. Annunciator: Install with top of panel not more than 56 inches above the finished floor.

3.2 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions as indicated on drawings. Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Smoke dampers in air ducts of designated air-conditioning duct systems.
2. Alarm-initiating connection to elevator recall system and components.
3. Alarm-initiating connection to activate emergency lighting control.
4. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
5. Supervisory connections at valve supervisory switches.
6. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
7. Supervisory connections at elevator shunt trip breaker.
8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
9. Supervisory connections at fire-pump engine control panel.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section “Electrical Identification.”

B. Install framed instructions in a location visible from fire-alarm control unit.
C. All initiating devices shall have bar code label installed visibly on the device. This bar code shall be used for digital inspection of the fire alarm system using Building Reports.Com.

3.4 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.5 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Architect, Engineer and authorities having jurisdiction.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.
   a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
   b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72; retain the "Initial/Reacceptance" column and list only the installed components.


3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.

5. Test visible appliances for the public operating mode according to manufacturer's written instructions.


E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
G. Prepare test and inspection reports.

H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

I. Annual Test and Inspection: During the warranty period, each year test fire-alarm system complying with visual and testing inspection requirements in NFPA72. Use forms developed for initial tests and inspections.

J. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner. Unless, the system is UL Listed to perform automatic sensitivity testing without any manual intervention and should detector fall outside of sensitivity window, the system will automatically indicated a devices trouble. A copy of UL letter is to be provided as proof of system operation.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 28 31 00